ORDER NO. DAD84040078C0

A2

Service Manual

Quartz Direct Drive Turntable System

SL-M2

[M], [MC], [E], [EK], [XL], [EB], [EH], [EF], [Ei], [EC], [XA], [XM], [PA], [PE], [PC], [XZ]

* Sets for [M] and [MC] areas are not provided with cartridge.

T4P is the standard mark for the "P-mount" plug-in-connector system.
Products carrying this mark are interchangeable and compatible with each other.

Areas

* [M] is available in U.S.A.
* [MC] is available in Canada.
* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EB] is available in Belgium.
* [EH] is available in Holland.
* [EF] is available in France.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.
* [PA] is available in far East PX.
* [PE] is available in European Military.
* [PC] is available in European Audio Club.
* [XZ] is available in New Zealand.

English

Specifications

Specifications are subject to change without notice for further improvement.
Weight and dimensions shown are approximate.

■ General

Power supply:	For U.S.A. and Canada: 120V AC, 60 Hz For others: ~110—120/220—240V, 50 or 60 Hz
Power consumption:	20 W
Dimensions: (W×H×D)	45.3 × 17 × 41.2 cm (17-27/32" × 6-11/16" × 16") Maximum height when dust cover is open 45.3 × 43 × 46 cm (17-27/32" × 16-15/16" × 18")
Weight:	12 kg (26.4 lb.)

■ Turntable section

Type:	Quartz direct drive Manual turntable Auto lift-up
Drive method:	Direct drive
Motor:	Brushless DC motor
Drive control method:	Quartz-phase-locked control
Turntable platter:	Aluminum die-cast Diameter 32.5 cm Weight 2.5 kg (including turntable mat)
Pitch control:	±6% range
Turntable speeds:	33-1/3 rpm and 45 rpm
Starting torque:	1.6 kg·cm
Build-up characteristics:	0.9 s. to 33-1/3 rpm
Braking system:	Electronic brake
Speed change due to load torque:	0% within 1.0 kg . cm (0.87 lb. in)
Wow and flutter:	0.008% WRMS* 0.022% WRMS (JIS C5521) ±0.031% peak (IEC 98A Weighted)

* This rating refers to turntable assembly alone, excluding effects of record, cartridge or tonearm, but including platter. Measured by obtaining signal from built-in frequency generator of motor assembly.

Rumble:	−70 dB (IEC 98A Unweighted) −82 dB (IEC 98A Weighted)

■ Tonearm section

Type:	Statically-balanced straight tonearm Plug-in connector cartridge system
Effective length:	230 mm (9-1/16")
Overhang:	15 mm (19/32")
Effective mass:	13.5 g (including cartridge)

Technics

Matsushita Engineering and Service Company
50 Meadowland Parkway,
Secaucus. New Jersey 07094

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Ave, 65 De Infanteria, KM 9.7
Victoria Industrial Park
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Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

Tracking error angle:	Within 2°32' at the outer groove of 30 cm (12") record Within 0°32' at the inner groove of 30 cm (12") record
Friction:	Less than 7 mg (lateral, vertical)
Stylus pressure adjustment range:	1.25 ±0.25 g
Applicable cartridge weight range:	6 g
Phono cable capacitance:	100 pF

■ Cartridge section

(Except for U.S.A. and Canada)

Type:	Moving magnet stereo cartridge
Magnet circuit:	All laminated core
Frequency response	10 Hz ~ 50 kHz 20 Hz ~ 10 kHz ±1 dB
Output voltage:	2.5 mV at 1 kHz, 5 cm/s. zero to peak lateral velocity (7 mV at 1 kHz, 10 cm/s. zero to peak 45° velocity [DIN 45 500])
Channel separation:	22 dB at 1 kHz
Channel balance:	Within 1.8 dB at 1 kHz
Recommended load impedance:	47 kΩ~100 kΩ
Compliance (dynamic):	12×10⁻⁶ cm/dyne at 100 Hz
Stylus pressure range:	1.25 ±0.25 g (12.5± 2.5 mN)
Weight:	6 g (cartridge only)
Replacement stylus:	EPS-33ES

Deutsch

TECHNISCHE DATEN

Änderungen der technischen Daten vorbehalten.
Die angegebenen Gewichts- und Abmessungsdaten sind ungeähre Werte.

■ Allgemeine Daten

Stromversorgung:	~110-120/220-240 V, 50/60 Hz
Leistungsaufnahme:	20 W
Abmessungen: (B×H×T)	45,3 × 17 × 41,2 cm Maximale Höhe bei geöffnetem Oberteil (Staubabdeckung). 45,3 × 43 × 46 cm
Gewicht:	12 kg

■ Plattenspieler

Typ:	Manueller Quartz-Direktantrieb-Plattenspieler Auto-Anhebung
Antrieb:	Direktantrieb
Motor:	Kollektorloser Gleichstrommotor
Antriebsregel-Methode:	Quarz-Steuerung QPL
Plattenteller:	Aluminium-Spritzguß Durchmesser 32,5 cm Gewicht: 2,5 kg (einschließlich Plattentellermatte)
Drehzahl-Feinregulierung:	±6% Einstellbereich
Plattenteller-Drehzahlen:	33-1/3 und 45 U/min
Anlaufdrehmoment:	1,6 kg·cm
Drehzahl-Hochlaufzeit:	0,9 s. vom Stillstand auf 33-1/3 U/min
Bremssystem:	Elektronische Bremse
Drehzahl-Abweichung aufgrund von Lastschwankungen:	0% innerhalb 1,0 kg·cm
Gleichlaufschwankungen:	0,008% WRMS* 0,022% WRMS (JIS C5521) ±0,031% Spitze (IEC 98A bewertet)

* Diese Nennleistung bezieht sich auf den Laufwerk-Bauteil allein, ausschließlich Einflüsse von Schallplatte, Tonabnehmer oder Tonarm, aber einschließlich Plattenteller. Gemessen anhand von Signalen vom eingebauten Frequenzgenerator des Motorbauteils.

Rumpel-Fremdspannungsabstand:	−70 dB (IEC 98A unbewertet)
Rumpel-Geräuschspannungsabstand:	−82 dB (IEC 98A bewertet)

■ Tonarm

Typ:	Statisch balanciertes Tonabnehmersystem vom Einsteck-Typ
Effektive Länge:	230 mm
Überhang:	15 mm
Effektive Masse:	13,5 g (einschließlich Tonabnehmer)
Spurfehlwinkel:	Innerhalb 2°32' bei der Einlaufrille einer 30 cm-Platte Innerhalb 0°32' bei der Auslaufrille einer 30 cm-Platte
Lagerreibung:	Weniger als 7 mg (horizontal, vertikal)
Auflagekraft-Einstellbereich:	1,25 ±0,25 g
Zulässiger Tonabnehmer-Gewichtbereich:	6 g
Phonokabel-Kapazität:	100 pF

■ Tonabnehmer

Typ:	Stereo-Magnet-Tonabnehmer mit Einpunkt-Aufhängungssystem
Magnetkreis:	Ganzlamellenkern
Frequenzgang:	10 Hz bis 50 kHz 20 Hz bis 10 kHz ±1 dB
Ausgangsspannung:	2,5 mV bei 1 kHz 5 cm/s. Null-zu-Spitze, lateral [7 mV bei 1 kHz 10 cm/s. Null-zu-Spitze, 45° (DIN 45 500)]
Kanaltrennung:	22 dB bei 1 kHz
Kanalabweichung:	Innerhalb 1,8 dB bei 1 kHz
Empfohlene Endimpedanz:	47 kΩ ~ 100 kΩ
Nachgiebigkeit (dynamisch):	12 × 10⁻⁶ cm/dyn bei 100 Hz
Auflagekraft-Einstellbereich:	1,25 ±0,25 g (12,5 ±25 mN)
Gewicht:	6 g (nur Tonabnehmer)
Ersatznadel:	EPS-33ES

Français

CARACTERISTIQUES

Les spécifications sont susceptibles d'être modifiées sans préavis.
Le poids et les dimensions donnés sont approximatifs.

■ Généralités

Alimentation:	Alternatif 110-120/220-240V, 50/60 Hz
Consommation:	20 W
Dimensions: (L×H×P)	45,3 × 17 × 41,2 cm Hauteur maximum lorsque le couvercle protège-poussière est ouvert: 45,3 × 43 × 46 cm
Poids:	12 kg

■ Platine de lecture

Type:	Entaînement direct à quartz Platine manuelle Soulèvement automatique
Système d'entraînement:	Entraînement direct
Moteur:	Moteur C.C. sans balai
Groupe de réglage:	Réglage d'accrochage de phase par quartz
Plateau de lecture:	En aluminium moulé sous pression Diamètre 32,5 cm Poids 2,5 kg (y compris le tapis du plateau)
Réglage d'écart:	Plage de réglage de ±6%
Vitesses de rotation:	33-1/3 et 45 t/p.m.
Couple de démarrage:	1,6 kg cm
Caractérisques d'augmentation:	0,9 s. à 33-1/3 t/p.m.
Système de freinage:	Frein électronique
Variation de vitesse due au couple de charge:	0% en deçà de 1,0 kg·cm
Pleurage et scintillement:	0,008% de valeur efficace* 0,022% de valeur efficace (JIS C5521) ±0,031% de crête (IEC 98A Pondéré)

* Ce régime nominal se rapporte à l'ensemble du tourne-disque seul, excluant les effets du disque, de la cellule pick-up ou du bras de lecture, mais comprenant le plateau. Mesuré par l'obtention d'un signal provenant du générateur de fréquences incorporé de l'ensemble du moteur.

Ronflement:	−70 dB (IEC 98A Non pondéré) −82 dB (IEC 98A Pondéré)

■ Bras de lecture

Type:	Bras de lecture rectiligne statiquement équilibré Système de cellule de lecture à connecteur enfichable.
Longueur effective:	230 mm
Porte-à-faux:	15 mm
Angle d'erreur de piste:	En deçà de 2°32' au sillon extérieur d'un disque de 30 cm En deçà de 0°32' au sillon intérieur d'un disque de 30 cm
Frottement:	Moins de 7 mg (latéral et vertical)
Masse réelle:	13,5 g (avec la cellule pick-up)
Plage de réglage de la pression d'appui:	1,25 ±0,25 g
Gamme du poids des cellules pick-up utilisables:	6 g
Capacitance du câble phone:	100 pF

■ Cellule pick-up

Type:	Cellule pick-up stéréo à aimant mobile
Circuit magnétique:	Noyau entièrement feuilleté
Réponse en fréquence:	10 Hz à 50 kHz 20 Hz à 10 kHz ±1 dB
Tension de sortie:	2,5 mV à 1 kHz; 5 cm/s., zéro à vitesse latérale de crête (7 mV à 1 kHz; 10 cm/s., zéro à vitesse 45° de crête [DIN 45 500])
Séparation des canaux:	22 dB à 1 kHz
Equilibrage des canaux:	En deçà de 1,8 dB à 1 kHz
Impédance de charge recommandée:	47 kΩ~100 kΩ
Elasticité (dynamique):	12×10^{-6} cm/dyne à 100 Hz
Plage de la force verticale d'appui:	1,25 ±0,25 g (12,5 ±2,5 mN)
Poids:	6 g (cellule seule)
Pointe de lecture de remplacement:	EPS-33ES

Español

ESPECIFICACIONES

Las especificaciones quedan sujetas a cambios sin aviso previo.
El peso y las dimensiones indicados son apromimados.

■ En general

Alimentación de corriente:	110—120/220—240V, 50/60 Hz
Consumo de corriente:	20 W
Dimensiones: (Ancho×Alto×Prof.)	45,3 × 17 × 41,2 cm Altura máxima cuando la tapa contra el polvo está abierta: 45,3 × 43 × 46 cm
Peso:	12 kg

■ Sección del plato giratorio

Tipo:	Plato giratorio manual con accionamiento directo por cuarzo con elevación automática
Método de accionamiento:	Accionamiento directo
Motor:	Motor de corriente continua sin escobillas
Método de control de accionamiento:	Control enclavado de fase de cuarzo
Platillo del plato giratorio:	De aluminio fundido Diámetro 32,5 cm Peso 2,5 g (incluyendo la almohadilla del plato giratorio)
Control de altra de sonido:	Ambito de ajuste: ±6%
Velocidades del plato giratorio:	33-1/3 y 45 rpm

Par de arranque:	1,6 kg·cm (1,3 lb·pulg.)
Caracteristicas de establecimiento:	0,9 s. a 33-1/3 r.p.m.
Sistema de frenado:	Freno electrónico
Cambio de velocidad debido al par motor de carga:	0% sin exceder 1,0 kg cm (0,87·pulg.)
Ululaciones y trémolo:	0,008% WRMS* 0,022% WRMS (JIS C5521) ±0,031% cresta (IEC 98A Ponderado)

* Estas características se refieren únicamente al conjunto del plato giratorio, con exclusión de los efectos provenientes del disco, cartucho o del brazo sonoro, incluyendo, empero, el platillo. La medida fue tomada por medio de la señal obtenida del generador de frecuencia incorporado del conjunto del motor.

Ruido de rodadura:	−70 dB (IEC 98A No ponderado) −82 dB (IEC 98A Ponderado)

■ Sección del brazo sonoro

Tipo:	Brazo sonoro recto equilibrado estáticamente Sistema de cartucho con conector enchufable
Longitud efectiva:	230 mm
Proyección:	15 mm
Masa efectiva:	13,5 g (incluyendo el cartucho)
Angulo de error de seguimiento:	Inferior a 2°32' en el surco exterior de un disco de 30 cm Inferior a 0°32' en el surco interior de un disco de 30 cm
Fricción:	Menos de 7 mg (en sentido lateral y vertical)
Radio de ajuste de la presión de la aguja:	1,25 ±0,25 g
Radio de peso de cartucho utilizable:	6 g
Capitancia del cable del fonógrafo:	100 pF

■ Sección del cartucho

Tipo:	Cartucho estereofónico de imán móvil
Circuito magnético:	Núcleo totalmente laminado
Respuesta de frecuencia:	10 Hz a 50 kHz 20 Hz a 10 kHz ±1 dB
Voltaje de salida:	2,5 mV a 1 kHz velocidad lateral de cero a cresta de 5 cm/s. [7 mV a 1 kHz Velocidad de 45° de cero a cresta de 10 cm/s. (DIN 45 500)]
Separación de canales:	22 dB a 1 kHz
Equilibrio de canales:	Inferior a 1,8 dB a 1 kHz
Impedancia de carga recomendada:	47 kΩ a 100 kΩ
Elasticidad (dinámica):	12×10^{-6} cm/dina a 100 Hz
Radio de presión de la aguja:	1,25 ±0,25 g (12,5 ±2,5 mN)
Peso:	6 g (cartucho solamente)
Aguja de recambio:	EPS-33ES

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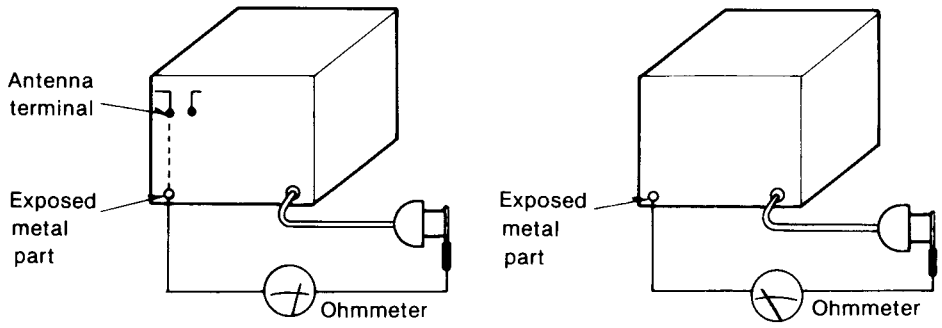
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

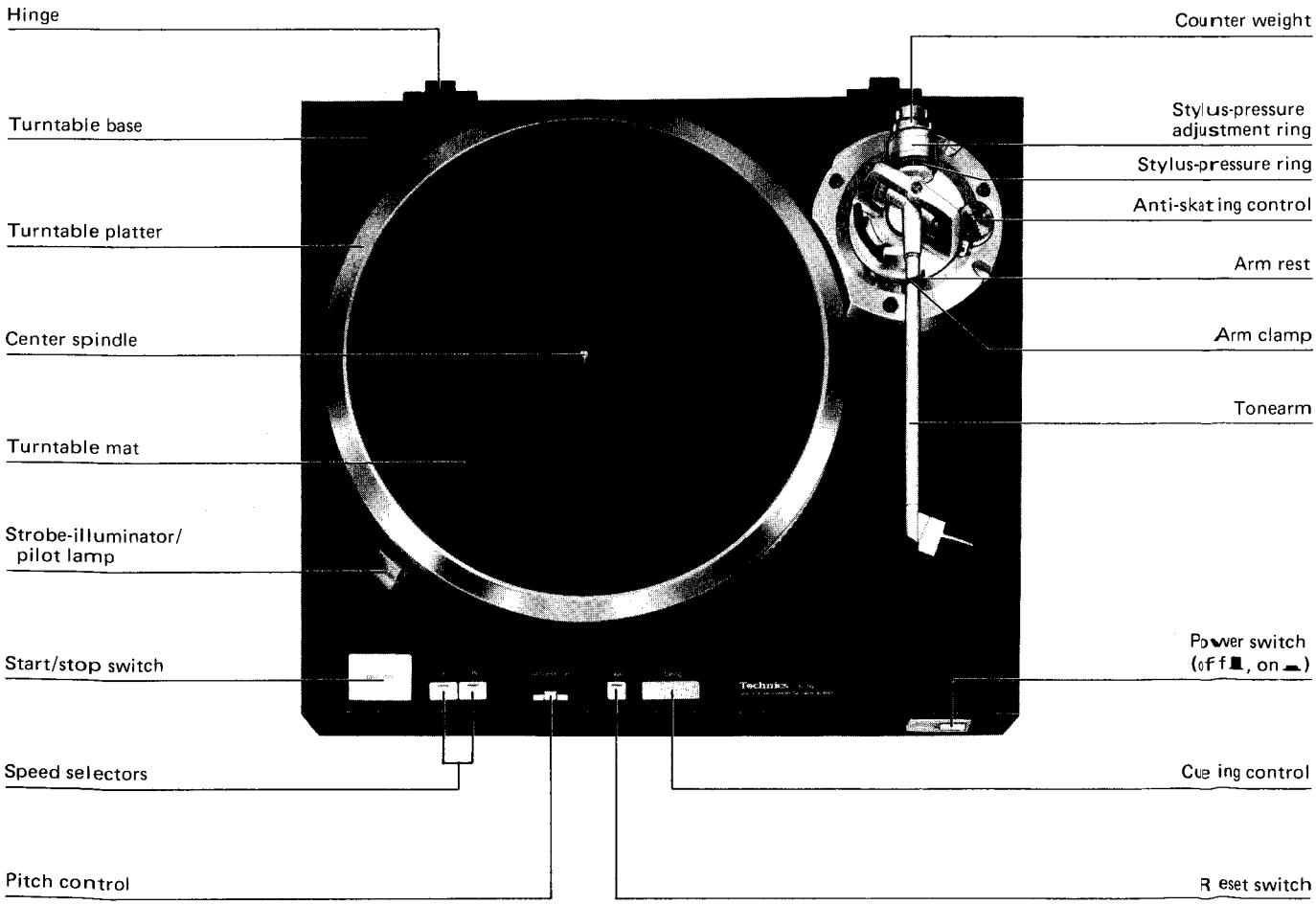
Resistance = 3MΩ—5.2MΩ

(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS



- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
  - ★ 120V (50/60 Hz) for U.S.A. and Canada.
  - ★ 220V (50/60 Hz) for Continental Europe.
  - ★ 240V (50/60 Hz) for United Kingdom and Australia.
  - ★ 110V-120V/220V-240V (50/60 Hz) for other areas.
  - ★ Sets for areas other than U.S.A. and Canada are provided with voltage selector.

■ DISASSEMBLY INSTRUCTIONS

• How to remove the bottom board

1. Remove the turntable mat and turntable platter.
2. Turn over the unit and remove the 4 setscrews (**Fig. 1:** ❶ – ❹) of the bottom board.
   Note: Put the unit on a soft cloth so that the dust cover will not be damaged.
3. To remove the insulator, remove the 4 setscrews (**Fig. 1:** ❺ – ❽).
   Note: The front and rear insulator springs are different.

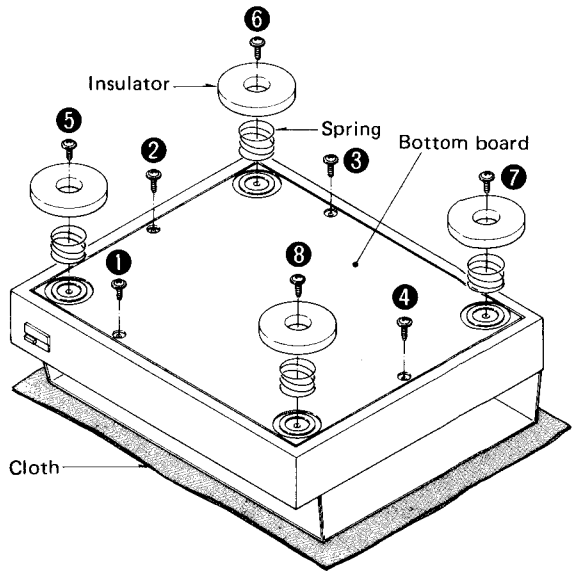


Fig. 1

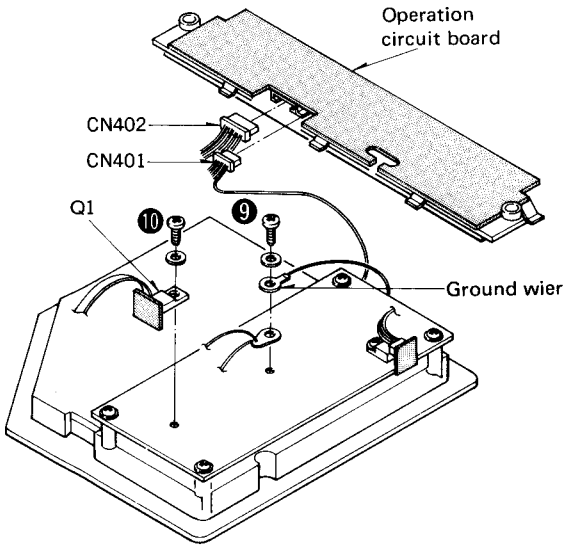


Fig. 2

4. Return the set and open the dust cover.
5. Remove the 4 cabinet cover setscrews (**Fig. 3:** ⓫ – ⓮).
6. Remove the 3 stator cover setscrews and 3 drive circuit board setscrews, and unsolder the 2 lead wires. Then the drive circuit board can be removed.

* When examine the drive circuit board, remove the cabinet cover and refer to "**Trouble shooting**".

• How to remove the drive circuit board.

1. Remove the bottom board. (**Refer to "How to remove the bottom board"**).
2. Remove the connector CN401 and 402 from the operation circuit board.
3. Remove the ground lead wire setscrew (**Fig. 2:** ❾) and the regulator transistor Q1 setscrew (**Fig. 2:** ❿).

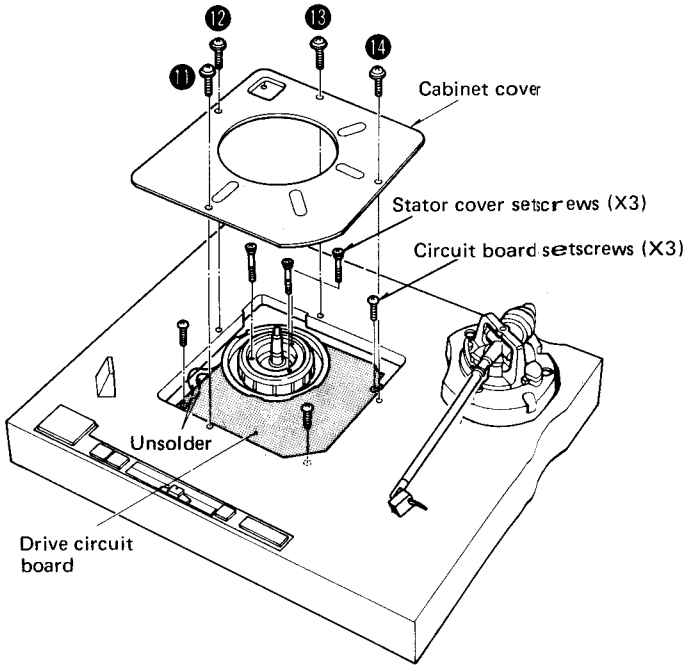


Fig. 3

• How to remove the tonearm control circuit board

1. Remove the bottom board (**Refer to "How to remove the bottom board"**).
2. Remove the connector CN303, 304 and 306 from the tonearm control circuit board.
3. Remove the transistor setscrew (**Fig. 4 :⑳**).
4. Release the 4 claws by pliers as shown in **Fig. 4**.

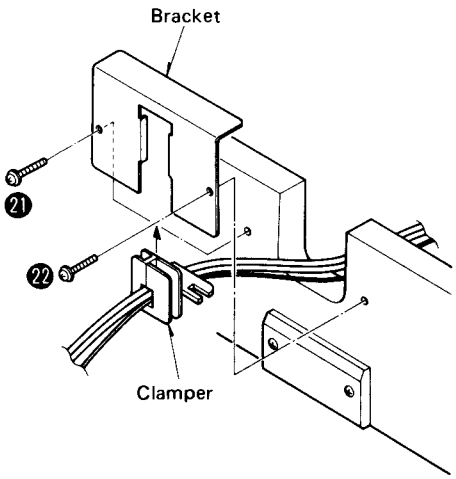


Fig. 5

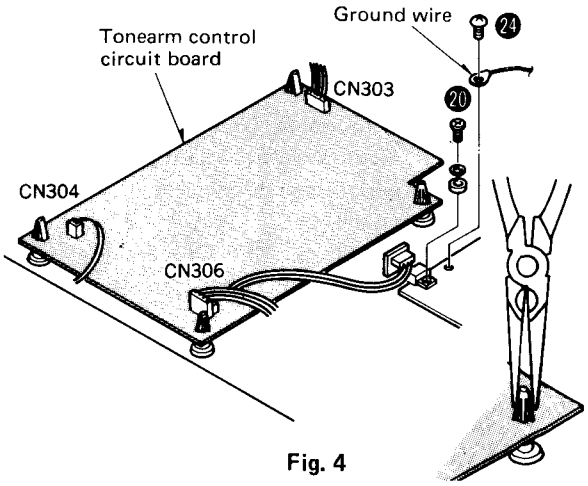


Fig. 4

• How to remove the phono output cords

1. Remove the bottom board (**Refer to "How to remove the bottom board"**).
2. Remove the 2 bracket setscrews (**Fig. 5 : ㉑ , ㉒**) and the bracket.
3. Remove the shield cover setscrew (**Fig. 6 : ㉓**) and shield cover.
4. Tear off the shield tape and unsolder the 3 lead wires from the phono output circuit board. (**Fig. 6**)

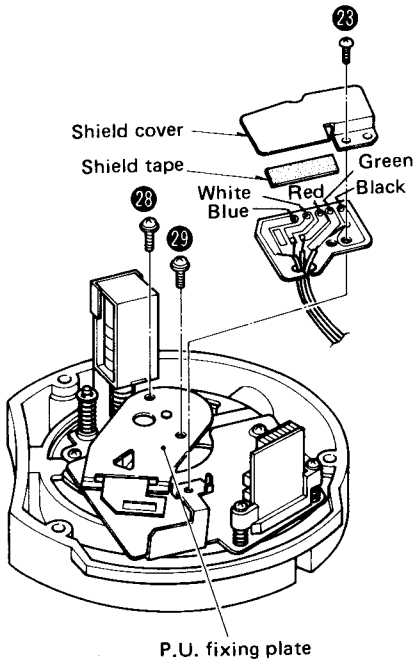


Fig. 6

• How to remove the tonearm base ass'y

1. Remove the phono output cords (**Refer to "How to remove the phono output cords"**).
2. Remove the ground wire setscrew (**Fig. 4: ㉔**).
3. Remove the connector CN303 from tonearm control circuit board.
4. Remove the 3 tonearm base ass'y hex screws (**Fig. 7: ㉕ ~ ㉗**) and lift the tonearm base ass'y in the direction of the arrow, and then the tonearm base ass'y can be removed.

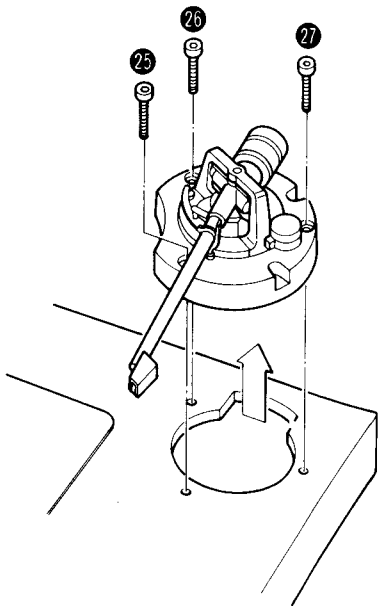


Fig. 7

• How to remove the sensor circuit board base and PU plate

1. Remove the tonearm base ass'y. (**Refer to "How to remove the tonearm base ass'y"**).
2. Unsolder the 5 lead wires (blue, white, red, green and black) from the phono output circuit board (**Fig. 6**).
3. Remove the 2 PU fixing plate setscrew (**Fig. 6 : ㉘ , ㉙**) and the PU fixing plate.
4. Remove the 3 setscrews (**Fig. 8 : ㉚ ~ ㉜**), and then the sensor circuit board base and PU plate can be removed.

Notes: Fitting of PU plate.

Fit the PU plate so that the hook of canceller spring touches the PU starting shaft as shown **Fig. 9** when the scale of antiskating knob is 0.6 ~ 0.9 with the arm calmped.

• How to remove the tonearm lift base

1. Remove the tonearm base ass'y (**Refer to "How to remove the tonearm base ass'y"**).
2. Remove the tonearm lift setscrew (**Fig. 10 : ㉝**).
3. Unsolder the 2 lead wires from the sensor circuit board.
4. Remove the 2 lift base setscrews (**Fig. 8 : ㉞ , ㉟**) and the lift base in the direction of the arrow.

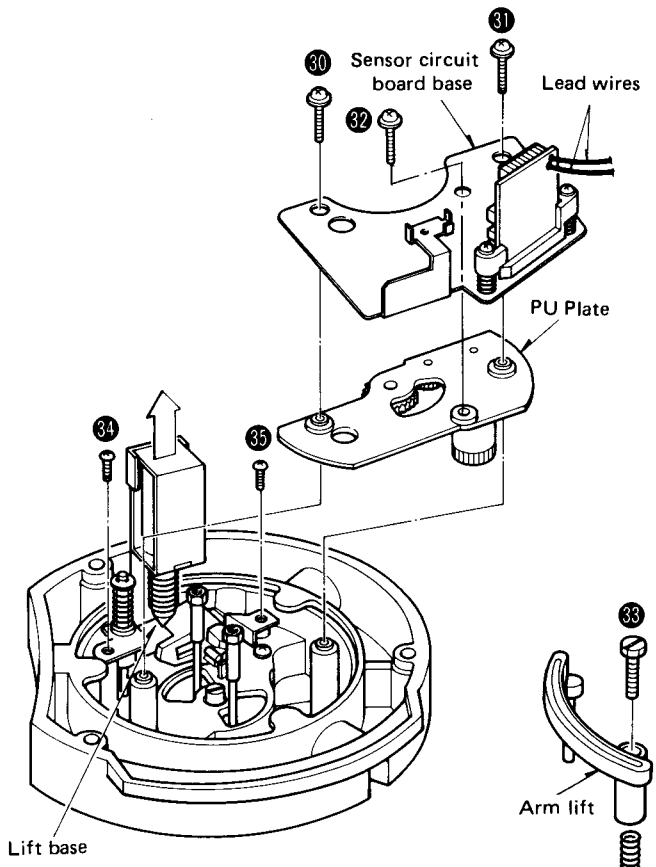


Fig. 8

Fig. 10

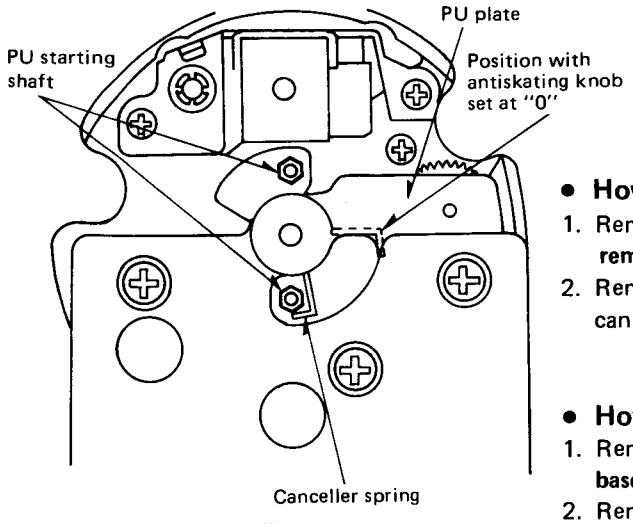


Fig. 9

• How to remove the tonearm

1. Remove the sensor circuit board base and PU plate (**Refer to "How to remove the sensor circuit board base and PU plate"**).
2. Remove the 2 tonearm setscrews (**Fig. 11 : ㊱ , ㊲**), and then the tonearm can be removed.

• How to remove the tonearm base

1. Remove the tonearm lift base (**Refer to "How to remove the tonearm lift base"**).
2. Remove the tonearm (**Refer to "How to remove the tonearm"**).
3. Completely loosen the 2 tonearm base setscrew (**Fig. 12 : ㊳ , ㊴**) and then the tonearm base can be removed.

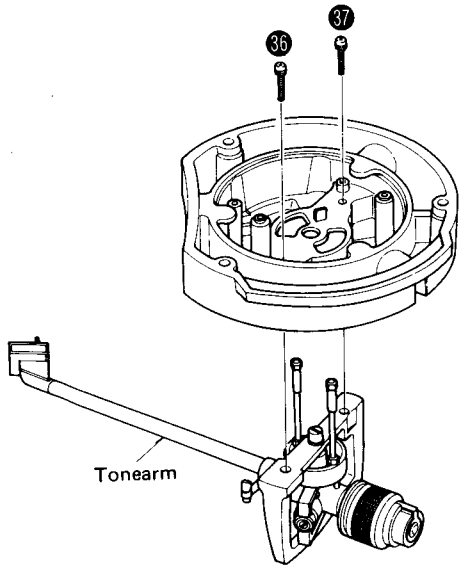


Fig. 11

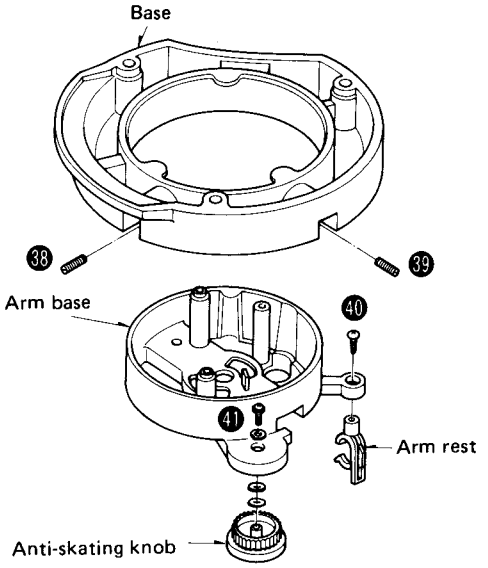


Fig. 12

• How to remove the tonearm rest and anti-skating knob

1. Remove the tonearm base (**Refer to "How to remove the tonearm base"**).
2. Remove the tonearm rest setscrew (**Fig. 12:** ㊵), and then the tonearm rest can be removed.
3. Remove the anti skating knob setscrew (**Fig. 12:** ㊶), and then the antiskating knob can be removed.

• How to remove the power switch and the operation circuit board.

1. Remove the bottom board. (**Refer to "How to remove the bottom board"**).
2. Remove the 2 bracket setscrews (**Fig. 13:** ㊷, ㊸) and pull out the power switch knob.
3. Remove the 2 power switch setscrews (**Fig. 13:** ㊹, ㊺), and then the power switch can be removed.
4. Remove the graduated plate of pitch control and the pitch control knob. (**Fig. 14**).
5. Remove the 4 operation circuit board setscrews (**Fig. 14:** ㊻ ~ ㊾).
6. Release the 2 claws, and then the pitch control base can be separated from the pitch control frame.

   Note: When removing the ornament plate and strobe frame from the cabinet, unfasten the bond locks shown in Fig. 15. When fitting the plate, lock the same portions with bond.
7. Release the 3 claws and raise the P.C.board in the direction of the arrow, and then P.C.board can be removed.

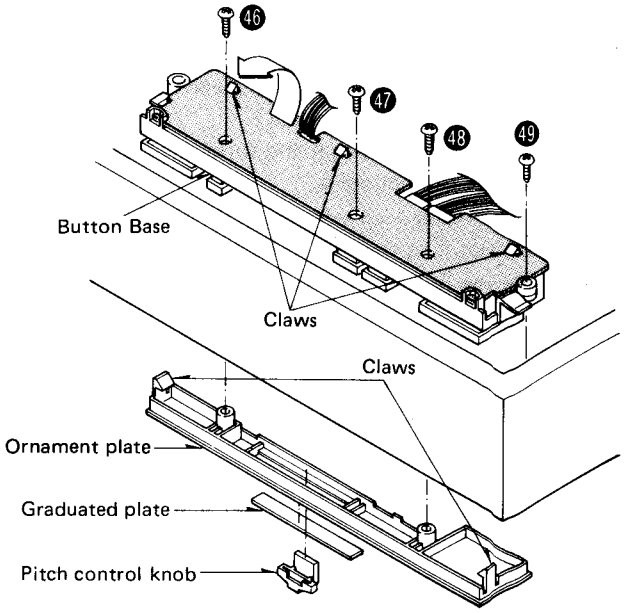


Fig. 14

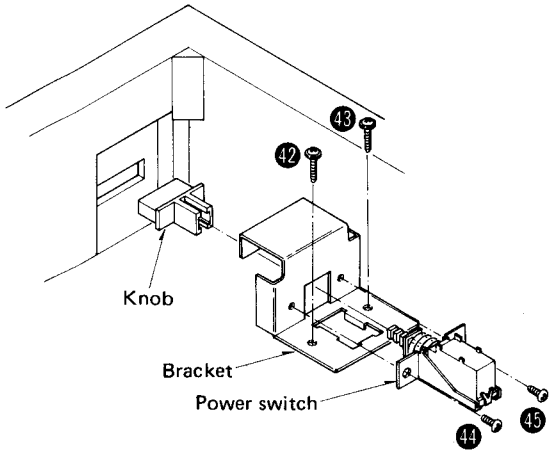


Fig. 13

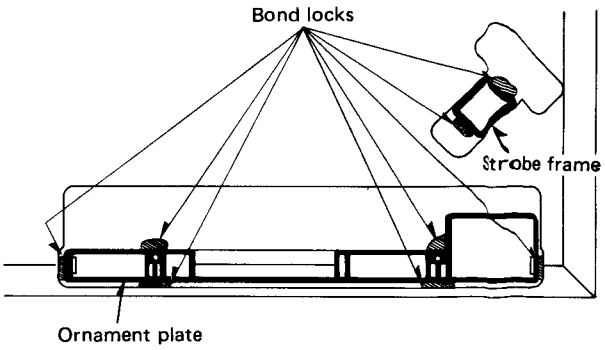


Fig. 15

• How to remove the counter weight (Fig. 16)

1. Completely loosen the adjustment ring and pull out the counter weight, and then counter weight can be removed.
2. When set the counter weight, insert the counter weight into the rear shaft cylinder by aligning the guide plate located at the bottom of the counter weight to the slit between rear shaft cylinder and adjusting ring.

*When the counter weight is removed, be sure to adjust.

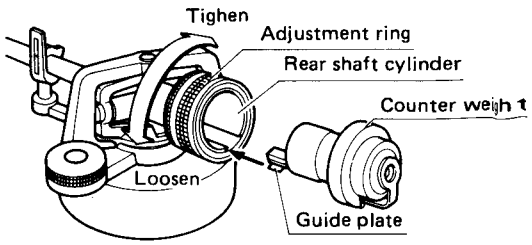


Fig. 16

■ TROBLE SHOOTING

• Conditions of the set

Case 1: Refer to Fig. 17. (Check each part in stop mode.)

(1) Remove the turntable mat and turntable platter.
(2) Remove the cabinet cover.
(3) Push the power switch and check each part.

Case 2: Refer to Fig. 18. (Checking each part in rotating mode.)

(1) Remove the turntable mat and turntable platter.
(2) Remove the cabinet cover.
(3) Insert the tester lead wire from the bottom of the set and connect it to the part to be checked.
(4) Connect the ground terminal of the tester to the GND terminal of the phono cable.
(5) Put on the turntable platter.
(6) Push the power switch and start button.

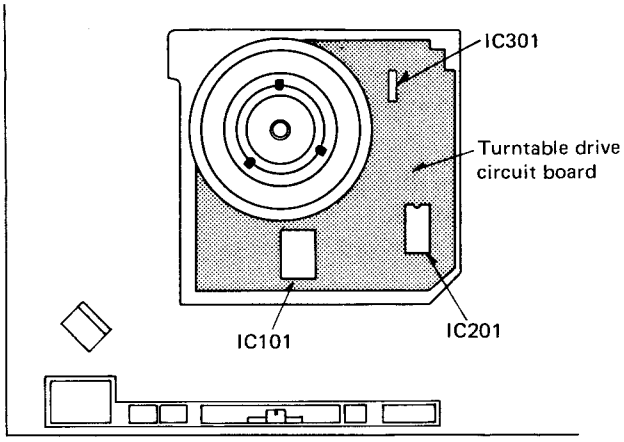


Fig. 17

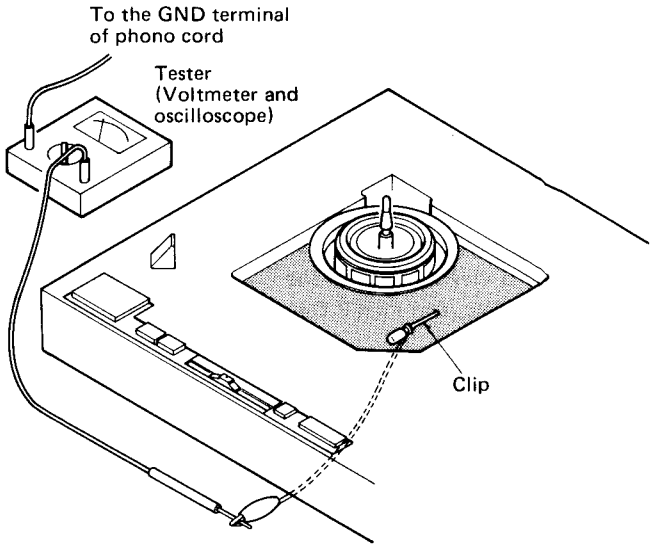
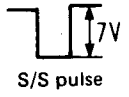
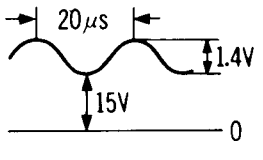


Fig. 18

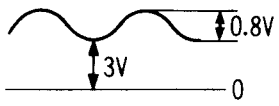
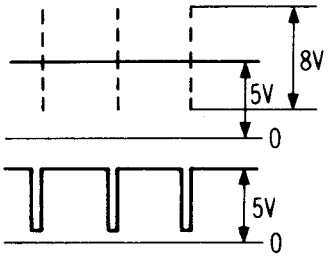
1. Turntable platter does not rotate

*In the table, "stop mode" is the initial state with power turned "on", and "start mode" is the state with S/S switch depressed.

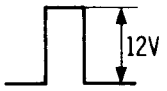
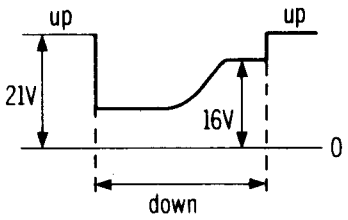
<table>
<tr><th></th><th>Probably defective circuit</th><th>Check point</th><th>Possible cause</th></tr>
<tr><td>1</td><td>Power supply circuit</td><td>DC voltage of Q1 (emitter) . . . . . 21V</td><td>S601, T1, D1, Q1 ~ 3</td></tr>
<tr><td>2</td><td>Turntable control circuit</td><td>DC voltage of IC201
<table><tr><th>Pin No.</th><th>Stop</th><th>Start</th></tr><tr><td>⑲</td><td>7.0V</td><td>  S/S pulse</td></tr><tr><td>⑳</td><td>5.9V</td><td>0.3V</td></tr><tr><td>㉑</td><td>0.2V</td><td>2.8V</td></tr></table></td><td>S303
IC201</td></tr>
<tr><td>3</td><td>Turntable drive circuit</td><td>DC voltage and waveform of IC101
<table><tr><th>Pin No.</th><th>Stop</th><th>Start</th></tr><tr><td>①</td><td>2.9V</td><td>2.9V</td></tr><tr><td>②</td><td>2.0V</td><td>13.0V</td></tr><tr><td>㉒</td><td>0.2V</td><td>2.8V</td></tr><tr><td>㉔</td><td>2.0V</td><td>2.0V</td></tr><tr><td>⑪
⑬
⑮</td><td colspan="2">  </td></tr></table></td><td>IC101
Drive coil</td></tr>
</table>

2. Defective rotation (runaway, unstable)

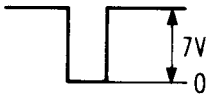
*In the table, the waveform is measured in rotating mode.

	Probably defective circuit	Check point	Possible cause
1	**FG amp. circuit**	Waveform of terminal ㉓ of IC201 20ms (33) 15ms (45)  	FG coil Q203 IC201
2	**Turntable contorl circuit**	Waveform of terminal ⑬ , ⑭ of IC201  	IC201 IC101

3. Cueing operation failure

	Probably defective circuit	Check point	Possible cause
1	**Cueing circuit**	DC voltage of Q358 (collector) (Press the cueing switch)  Cueing command pulse	S304 Q358
2	**Cueing plunger drive circuit**	DC voltage of Q357 (collector)  	IC303 Q356, 357 Cueing plunger

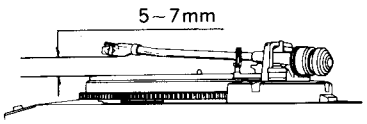
4. Auto stop and lift-up failure

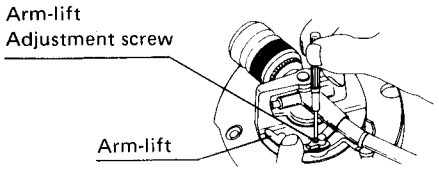
	Probably defective circuit	Check point	Possible cause
1	**End detection circuit**	● Trace a 1mm pitch record. Waveform of IC307 (① pin) 	PC601 Q601 IC307 Adjustment of output voltage
2	**Stop command circuit**	● Trace the final groove of record. DC voltage of Q373 (collector)  (Stop command pulse)	IC303, 304 306 ~ 308 Q353, 354 371 ~ 373
3	**Cueing command circuit**	Refer to **"Cueing operation failure"** previously mentioned.	

■ MEASUREMENTS AND ADJUSTMENT English

1. Arm-lift height

The arm-lift height (distance between the stylus tip and record surface when the tonearm is raised) has been adjusted at the factory before shipping to approximately 5 – 7 mm.
If the clearance becomes too narrow or too wide, turn the adjustment screw clockwise or counterclockwise while pushing the arm lift down.
Clockwise rotation
–distance between the record and stylus tip is decreased.
Counterclockwise rotation
–distance between the record and stylus tip is increased.

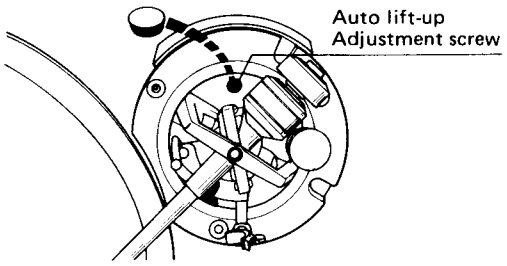




2. Automatic lift-up position

1. Put the stylus protector on the cartridge.
2. Remove the rubber cap.
3. Release the arm clamp and move the tonearm toward the center of the record.
   The auto lift-up adjustment screw will appear.
4. Turn the screw with a screwdrive, clockwise or counterclockwise as necessary.

If the tonearm tends to lift up from the record surface before the play has finished.
–turn counterclockwise
If the tonearm fails to lift up after the final groove.
–turn clockwise.



3. Adjustment of brake

1. Turn power switch "on" and set the speed selector to "33 r.p.m."
2. Depress the stop button in rotating mode and adjust VR201 so that the turntable platter stops within a range of 90° ~ 180° **(See Fig. 19.)**

4. Adjustment of pitch control

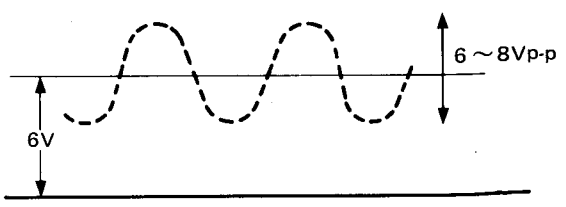
1. Connect a frequency counter between TP27 and terminal G. **(See Fig. 19.)**
2. Set the pitch control knob to **"0"**., and the reset switch to **"off"**.
3. Adjust VR301 so that the frequency is 262.075 ~262.085 kHz on the frequency counter.

5. Adjustment of slit plate gap

1. Adjust the 2 adjust screws so that the gap between the slit plate and photo coupler is 1.0±0.2 mm. **(See Fig. 20.)**
2. Make sure that the slit plate is parallel to the coupler.

6. Adjustment of output voltage

1. Remove the bottom board and connect an oscilloscope to pin ② of sensor board BT601.
2. Let it trace a 1 mm pitch record at 33 r.p.m. and then adjust VR601 so that the waveform is as shown below in the position within 65 mm from the center of the record.



- **Adjustment points**

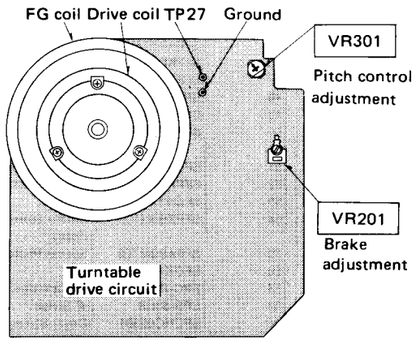


Fig. 19 Abb. 19

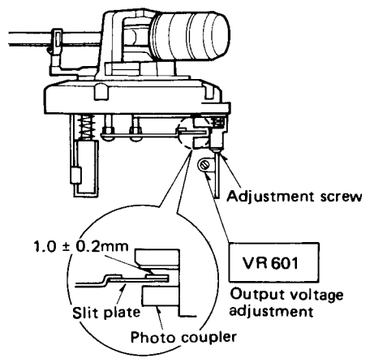


Fig. 20 Abb. 20

■ MESSUNGEN UND JUSTIERUNGEN — Deutsch

1. Justierung der Tonarmlifthöhe

Die Anhebehöhe des Tonarms (Distanz zwischen Nadelspize und Plattenoberfläche bei angehobenem Tonarm) wurde in der Fabrik vor dem Versand auf ca. 5–7 mm eingestellt.
Falls der Abstand zu groß oder zu klein wird, drehen Sie die Justierschraube im Uhrzeigersinn oder Gegenuhrzeigersinn während Sie die Tonarmliftführung nach unten drucken.
Drehung im Uhrzeigersinn
–Der Abstand wird kleiner.
Drehung im Gegenuhrzeigersinn
–Der Abstand wird größer.

2. Einetellung der automatischen Anhebeposition (Lift)

1. Setzen Sie den Nadelschutz auf den Tonabnehmer auf.
2. Die Gummikappe abnehmen.
3. Führen Sie den Tonarm gegen die Plattenmitte. Die Auto-Anhebungseinstellschraube wird erscheinen.
4. Drehen Sie die Justierschraube mit einem Schraubenzieher im Uhrzeigersinn oder entgegen dem Uhrzeigersinn, wie erforderlich.
   Falls der Tonarm die Neigung hat, sich vor dem Beendigen des Abspiels von der Schallplatte abzuheben,
   –im Gegenuhrzeigersinn drehen.
   Falls der Tonarm sich nach der Endrille nicht abhebt,
   –im Uhrzeigersinn drehen.

3. Justierung der Bremse

1. Die stromzufuhr einschalten und den Drehzahl-Wahlschalter auf "33 UpM einstellen.
2. Die Stoptaste im rotierenden Zustand drücken und VR201 so abstimmen, daß der Plattenteller innerhalb 90°–180° stoppt. **(Siehe Abb. 19.)**

4. Justierung des Drehzahlreglers

1. Einen Frequenzzähler zwischen TP27 und Anschluß G anschließen. **(Siehe Abb. 19.)**
2. Den Drehzahlreglerknopf auf "0" stellen und den Rückstellschalter auf "off" stellen.
3. VR301 so justieren, daß die Frequenz 262,075 ~ 262,085 kHz auf dem Frequenzzähler beträgt.

5. Justierung der Schlitzplatten-Abstands

1. Die beiden Justierschrauben so einstellen, daß der Abstand zwischen der Schlitzplatte und dem Fotokoppler 1,0 ±0,2mm beträgt. **(Siehe Abb. 20.)**
2. Überprüfen, da die Schlitzplatte parallel zum Koppler ist.

6. Justierung der Ausgangsspannung.

1. Die Bodenplatte entfernen und ein Oszilloskop an Stift 2 der Sensorplatine BT601 anschließen.
2. Eine Platte mit 1mm-Rillenabstand bei 33 UpM abspielen und dann VR601 justieren, so daß die Wellenform wie nachstehend gezeigt ist, und zwar bei einer Position innerhalb 65mm von der Plattenmitte.

■ MESURAGES ET RÉGLAGES — Français

1. Mise au point de la hauter de lélévateur du bras

La hauteur d'élévation du bras (distance entre l'extrémité de la pointe de lecture et la surface du disque lorsque le bras de lecture est soulevé) a été ajustée à l'usine avant l'expédition sur approximativement 5–7 mm.
Si l'écartement devient trop étroit ou trop large, tourner la vis de réglage dans le sens des aiguilles d'une montre ou en sens inverse, tout en abaissant l'élévateur du bras.
Rotation dans le sens des aiguilles d'une montre.
–La distance entre la surface du disque et l'extrémité de la pointe de lecture diminue.
Rotation dans le sens coutraire des aiguilles d'une montre.
–La distance entre la surface du disque et l'exrémité de la pointe de lecture augmente.

2. Ajustement de la position de soulévement automatique

1. Placer le capot protecteur de la pointe de lecture sur la cellule pick-up.
2. Retirer le capuchon en caoutchouc.
3. Libérer le clip de retenue du bras et déplacer le bras de lecture vers le centre du disque.
   La vis d'ajustement de soulévement automatique apparaîtra.
4. Avec un tournevis, tourner la vis de réglage dans le sens des aiguilles d'une montre ou dans le sens inverse selon la nécessité.
   Si le bras de lecture a tendance à se soulever de la surface du disque avant que l'audition de soit achevée:
   – Tourner dans le sens inverse des aiguilles d'une montre.
   Si le bras de lecture ne réussit pas à se soulever aprés le sillon final:
   –Tourner dans le sens des aiguilles d'une montre.

3. Ajustement du frein

1. Tourner l'alimentation en courant sur "on" (en circuit) et régler le sélecteur de vitesse sur "33 r.p.m." (33t/p.m.).
2. Appuyer sur la touche d'arrêt dans le mode de rotation et ajuster VR201 de telle sorte que le plateau de lecture s'arrête en deçà dúne plage de 90°–180°. **(Voir la Fig. 19.)**

4. Ajustement du réglage d'écart

1. Raccorder un fréquencemètre entre TP27 et la borne G. **(Voir la Fig. 19.)**
2. Régler la manette de réglage d'écart sur "0" et l'interrupteur de réenclenchement sur "off" (hors circuit).
3. Ajuster VR301 de telle sorte que la fréquence soit de 262,075 ~ 262,085 kHz sur la fréquencemètre.

5. Ajustement de l'intervalle de la plaque a fente

1. Régler les deux vis dájustement de telle sorte que l'intervalle entre la plaque à fente et le coupleur photoélectrique soit de 1,0 ± 0,2mm. **(Voir la Fig. 20.)**
2. Sássurer que la plaque à fente soit parallèle au coupleur.

6. Ajustement de la tension de sortie

1. Retirer la plaquette de la face inférieure et raccorder un oscilloscope à la broche 2 de la plaquette du dispositif de détection BT601.
2. Le laisser tracer un disque à l'écart de 1mm à 33t/p.m., puis ajuster VR601 de telle sorte que la forme d'onde soit telle qu'elle est montrée ci-dessous dans une position d'en deçà 65mm à partir du centre du disque.

■ MEDICIONES Y AJUSTE — Español

1. Ajuste de la altura de elevación del brazo

La altura de elevación del brazo (o sea, la distancia entre la punta de la aguja y la superficie del disco cuando el brazo sonoro está alzado) ha sido regulada aproximadamente entre 5 y 7 mm antes de despachar el equipo de la fábrica. En caso que la distancia se vuelve demasiado abundante o demasiado escasa, habrá que girar el tornillo de ajuste hacia la derecha o hacia la izquierda mientras se empuja para abajo la elevación del, brazo.
Rotación hacia la derecha
–reduce la distancia entre el disco y la punta de la aguja.
Rotación hacia la izquierda
–aumenta la distancia entre el disco y la punta de la aguja.

2. Ajuste de la posición de elevación automática

1. Colocar la protección de la aguja en el cartucho.
2. Quitar la tapita de goma.
3. Soltar la grapa del brazo y mover el brazo sonoro hacia el centro del disco.
   Aparecerá el tornillo de ajuste de elevación automática.
4. Girar el tornillito de ajuste hacia la derecha o hacia la izquierda usando un destornillador, según sea necesario.
   En caso que el brazo tienda a levantarse de la superficie del disco antes de que se acabe de tocar el disco,
   —Girar hacia la izquierda.
   En caso que el brazo sonoro no se alce después de tocar el último surco,
   —Girar hacia la derecha.

3. Ajuste de freno

1. Encender la alimentación de corriente y poner el selector de velocidad en "33 r.p.m.".
2. Apretar el botón de parada en estado giratorio y regular VR201 de manera tal que el platillo del plato giratorio cese de girar en un ámbito de 90°—180°. **(Ver la Fig. 19.)**

4. Ajuste de control del paso

1. Conecte un contador de frecuencia entre TP27 y terminal G. **(Vea la Fig. 19.)**
2. Ponga la perilla de control del paso en "0" y el interruptor de reposición en "off" (desconectado).
3. Ajuste VR301 de manera que la frecuencia sea 262,075 ~ 262,085 kHz en el contador de frecuencia.

5. Ajuste de intervalo de la place de la hendidura

1. Regular los dos tornillos de ajuste de manera que el intervalo entre la placa de la hendidura y el fotoacoplador resulte 1,0 ± 0,2 mm. **(Ver la Fig. 20.)**
2. Cerciorarse de que la placa de la hendidura quede paralela al acoplador.

6. Ajuste de voltaje de salida

1. Quitar la tabla del fondo y conectar un osciloscopio al pasador 2 del tablero sensor BT601.
2. Dejarlo recorrer un disco con paso de 1mm a 33 revoluciones pasando luego a regular VR601 de manera tal que la forma de onda resulte como se ilustra a continuación en la posición comprendida entre 65mm a partir del centro del disco.

■ REPLACEMENT PARTS LIST

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety.
   When replacing any of these components, use only manufacturer's specified parts.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
4. The "Ⓢ" mark is servico standard parts and may differ from production parts.
5. The parenthesized numbers in the columns of description stand for the quantity per set.

Areas

- * [M] is available in U.S.A.
- * [MC] is available in Canada.
- * [E] is available in Switzerland and Scandinavia.
- * [EK] is available in United Kingdom.
- * [XL] is available in Australia.
- * [EB] is available in Belgium.
- * [EH] is available in Holland.
- * [EF] is available in France.
- * [Ei] is available in Italy.
- * [EC] is available in Czechoslovakia.
- * [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- * [XM] is available in Central South America.
- * [PA] is available in far East PX.
- * [PE] is available in European Military.
- * [PC] is available in European Audio Club.
- * [XZ] is available in New Zealand.

Ref. No.	Part No.	Description
INTEGRATED CIRCUITS		
IC101	AN6675	Drive
IC201	AN6680	Control
IC301	AN6682	Pitch Control
IC302	MN4011B	NAND Gate
IC303	MN4027B	JK Flip Flop
IC304	MN4011B	NAND Gate
IC305	MN4516B	4Bit Binary Counter
IC306	AN78M12	Regulator
IC307	AN6914	Operation Amplifier
IC308	MN4027B	JK Flip Flop
IC401	MN4013B	D Flip Flop
TRANSISTORS		
Q1	2SD1265	Regulator
Q2,3	2SD637	Regulator
Q201 Ⓢ	2SC1846-R	Regulator
Q202	2SD637	LED Drive
Q203 Ⓢ	2SC1328-T	FG Amprifier
Q353,354	2SD636	Stop Control
Q356,357	2SD893A	Cueing Control
Q358	2SD636	Switching
Q371	2SB641	Switching
Q372	2SB643	Stop Control
Q373	2SD636	Stop Control
Q374	2SD636	Switching
Q401	2SD636	Switching
Q601	2SC1684-Q	End Detector
DIODES		
D1 ⚠	SVDS1RBA20Z	Rectifier
D2	MA1051M	5.1V, Zener
D204 Ⓢ	MA162A	Switching
D301	MA1051M	5.1V, Zener
D353 Ⓢ	MA162A	Switching
D355,356 Ⓢ	MA162A	Switching
D358 Ⓢ	MA162A	Switching
D401,402 Ⓢ	MA162A	Switching
D403,404, 405	SVDSLH54VT3	Reset & Speed Indicator
D501,502, 503	SVDSLH54DC3	Strobe
D601 Ⓢ	MA162A	Pulse Killer
VARIABLE RESISTORS		
VR201 Ⓢ	EVTS3MA00B54	Brake Adj.,50kΩ(B)
VR301	EVMH9GA00B53	Pitch Control Adj.,5kΩ(B)
VR401	EWAPF5X05AU4	Pitch Control,17kΩ
VR601	EVN60AA00B15	Output Voltage Adj., 100KΩ(B)
SWITCHES		
S401~405	EVQQS405K	Start/Stop,Speed Selector,Reset and Cueing
S601 ⚠ S602 Except for[M,MC] ⚠	ESB823V SFDSHXW01317	Power Voltage Selector
CRYSTAL		
X201	SVQMS4193	4.193MHz
COILS		
L301,302	SPO305-1R2K	Choke
POWER TRANSFORMER		
T1[M] ⚠	SLT66DTL3A	Power Source
T1[MC] ⚠	SLT66DT14C	Power Source
T1[Other areas] ⚠	SLT66DTE13E	Power Source
FUSE		
F1[MC Only] ⚠	XBA1F16NU14	125V,1.6A
F1 Except For[M,MC] ⚠	XBA2C025TR0	250V,T250mA

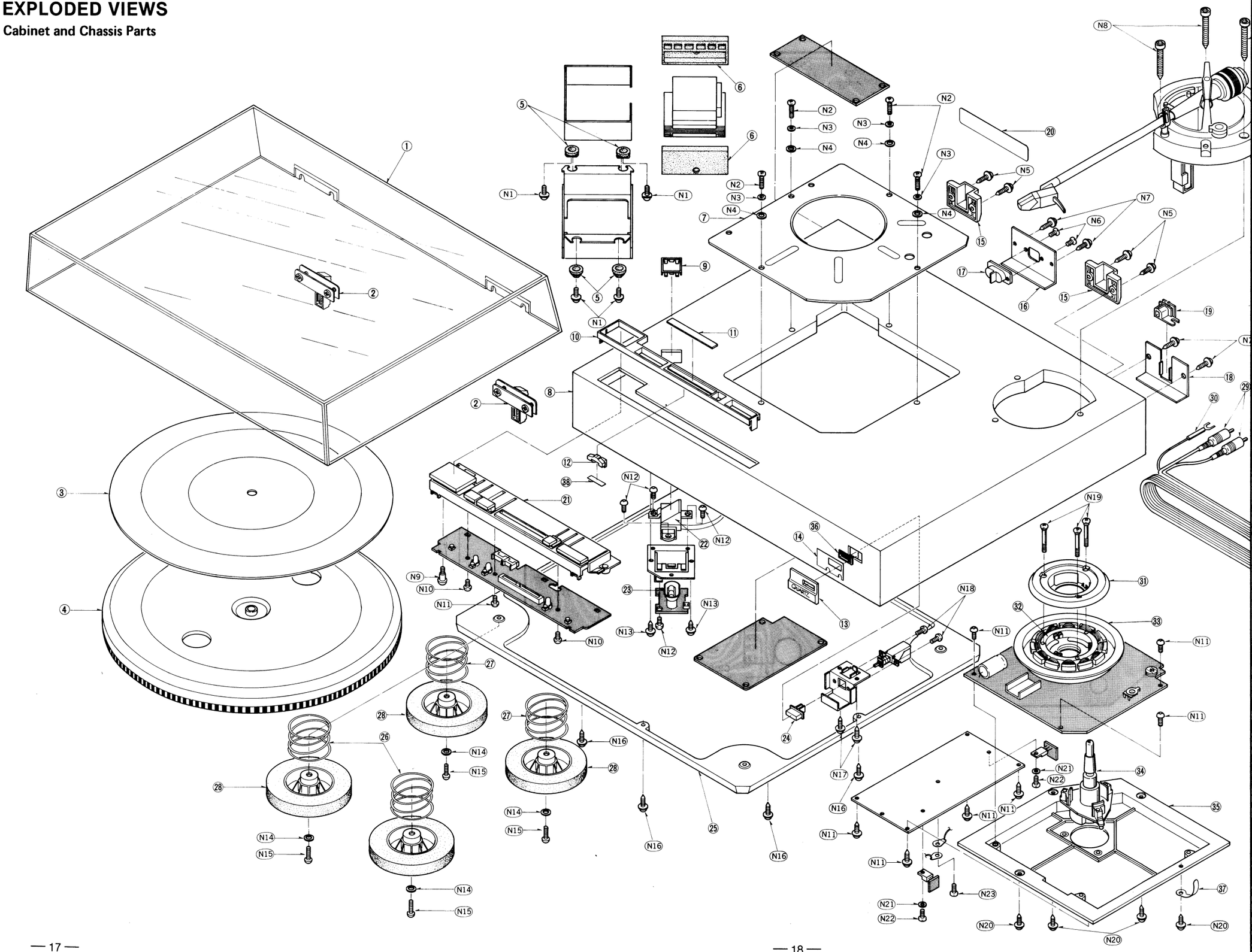
Ref. No.	Part No.	Description
CABINET PARTS		
1	SFADM01N01E	Dust Cover (1)
2	SFATM02N01A	Hinge (2)
3	SFTGM01N01	Turntable Mat (1)
4	SFTEM01N01Z	Turntable Platter (1)
5	SFGCM01N02	Cushion Rubber, Power Transformer (4)
6	SFGCM01N01	Cushion Rubber, Power Transformer (2)
7	SFUPM02N04	Cover,Cabint (1)
8	SFACM02N01R	Cabinet (1)
9	SFUMM02N05	Guide,Strobe (1)
10	SFUMM02N02	Guide,Operation Button (1)
11	SFUZM02N01	Scale,Pitch Control (1)
12	SFKTM02N01	Knob,Pitch Control (1)
13	SFKBM02N01	Badge,Cabinet (1)
14	SFUZM02N02	Tape,Badge (1)
15	SFUMM02N04	Case,Hige (2)
16	SFUPM01N07	Bracket,AC Socket (1)
17[M, ⚠ MC,XL, XA,XM, PA,PE, PC]	SFDJHSC0491	AC Socket (1)
17[XZ] ⚠	SFDJHSC516-1	AC Socket (1)
17[Other areas] ⚠	SFDJHSC0498	AC Socket (1)
18	SFUPM01N08	Bracket,Phono Output Cord (1)
19	SFUMQ34N10	Clamper,Phono Output Cord (1)
20[M]	SFNNM02M01	Name Plate (1)
20[MC]	SFNNM02C01	Name Plate (1)
20[E,EC]	SFNNM02S01	Name Plate (1)
20[EK,XL, XZ]	SFNNM02G01	Name Plate (1)
20[XA,XM]	SFNNM02X01	Name Plate (1)
20[PC]	SFNNM02P02	Name Plate (1)
20[PA,PE]	SFNNM02P01	Name Plate (1)
20[Other areas]	SFNNM02R01	Name Plate (1)
21	SFUMM02N01R	Operation Button (1)
22	SFUM130-01	Cover,Strobe (1)
23	SFGZM02N02	Spacer,Strobe L.E.D (1)
24	SFKTM02N02	Button,Power Switch (1)
25	SFAUM02N01	Bottom Board (1)
26	SFQAM02N01	Spring(Front),Insulator (2)
27	SFQAM02N02	Spring(Rear),Insulator (2)
28	SFGAM02N01E	Insulator (4)
29	SFDHM01N01	Phono Output Cord (1)
30	SFEL028-01E	Ground Cord (1)
31	SFMGQ20-01	Cover,Stator Frame (1)
32	SFMG520-31A	Drive Coil Ass'y (1)
33	SFMZ172-01E	FG Coil Ass'y (1)
34	SFMZM01N01A	Shaft Ass'y,Turntable (1)
35	SFUMM02N03	Base,DriveCircuit Board (1)
36	SFUMM02N06	Bracket,Power Switch (1)
37	SXE513	Clamper,Lead Wires (1)
38	SFUZM02N04	Spacer,Pitch Control Knob (1)
TONEARM PARTS		
40	SFPAM0M102R	Tonearm Ass'y (1)
41	SFPWG0M102A	Counter Weight Ass'y (1)
42	SFPRT0M102E	Tonearm Lift Ass'y (1)

Ref. No.	Part No.	Description
43	SFQA829-03	Spring,Tonearm Lift (1)
44	SFPRT0M101E	Tonearm Rest (1)
45	SFPAB17206	Knob,Anti-Skatig (1)
46	SFPKD0M101E	Tonearm Base Ass'y (1)
47	SFPZB0M109	Spacer,Fixing Base (1)
48	SFPAB0M106Z	Solenoid Ass'y (1)
49	SFPAB0M101A	P.U.Base Ass'y (1)
50	SFPKD0M102	Fixing Base, Tonearm Base (1)
51	SFPAB0M104A	P.U.Fixing Plate Ass'y (1)
52	SFPAB0M102E	Base,Sensor (1)
53	SFQA172-52	Spring (1)
54	SFPZB0M103	Holder,Sensor Circuit Board (1)
55	SFPAB0M108	Spacer,Photo Sensor (1)
56	SFGK170-01	Cap (1)
58	EPC-P33S	★ Cartridge (1)
59	EPS-33ES	★ Stylus (1)
60	SFCNC03301	Cover,Stylus (1)
SCREWS, NUT and WASHERS		
N1	SFXGM02N02	Screw, Power Transformer (4)
N2 Ⓢ	XSN3+12BVS	Screw,Cabinet Cover (4)
N3 Ⓢ	XWA3BFZ	Washer,Cabinet Cover (4)
N4 Ⓢ	XWG3FZ	Washer,Cabinet Cover (4)
N5	XTWS3+20QFZ	Screw,Hinge Case (4)
N6	XTV4+6GFZ	Screw,AC Socket (2)
N7	XTWS3+14QFZ	Screw,AC Cord and Phono Output Cord Holder (4)
N8	SFXGM01N02	Screw,Tonearm Base (3)
N9	SFXG066N01	Screw, (1)
N10 Ⓢ	XTV3+10BFN	Screw,Operation Circuit Board (2)
N11 Ⓢ	XTV3+8BFN	Screw,Operation P.C.B. and Drive P.C.B (4)
N12 Ⓢ	XTN3+8B	Screw,Strobe P.C.B (4)
N13	XTWS3+12QFZ	Screw,Strobe P.C.B (2)
N14 Ⓢ	XWA3BFZ	Washer,Insulator (4)
N15 Ⓢ	XSN3+16BVS	Screw,Insulator (4)
N16	XTWS3+25QFZ	Screw,Bottom Board (4)
N17	XTWS3+14QFZ	Screw,Power Switch (2)
N18 Ⓢ	XTV3+6BFN	Screw,Power Switch (2)
N19	SFXGM02N01	Screw,Stator Coil (3)
N20	SFXGM02N03	Screw,Stator Base (4)
N21 Ⓢ	XWA3B	Washer (2)
N22 Ⓢ	XSN3+6S	Screw (2)
N23	XYE3+EJ8	Screw (1)
N25	SFPEV0M101	Screw,Lift Ass'y (1)
N26 Ⓢ	XTN3+6B	Screw,Tonearm Rest (4)
N27	SFXW701-02	Washer,Anti-Skating Knob (1)
N28	SFPEW17201	Washer,Anti-Skatig Knob (1)
N29	XTW26+5E	Screw,Anti-Skating Knob (1)
N30 Ⓢ	XWA3B	Washer,Tonearm Ass'y (4)
N31 Ⓢ	XSN3+10S	Screw,Tonearm Ass'y (2)
N32	XXE4D12FNS	Screw,Fixing Base (2)
N33 Ⓢ	XSN3+6S	Screw,PU Fixing Plate (2)
N35 Ⓢ	XTW3+10TFZ	Screw,Sensor Base (3)
N36 Ⓢ	XSN2+5	Screw,Sensor P.C.B (2)
N37 Ⓢ	XWA2B	Washer,Sensor P.C.B (2)
N38	SFPEN0P301	Nut,Sensor P.C.B (2)
N39 Ⓢ	XWE26BW	Washer,Sensor P.C.B (2)
N40 Ⓢ	XSN26+6	Screw,Sensor P.C.B (2)
N41	SFPEV0Q601	Screw,Head Shell (1)

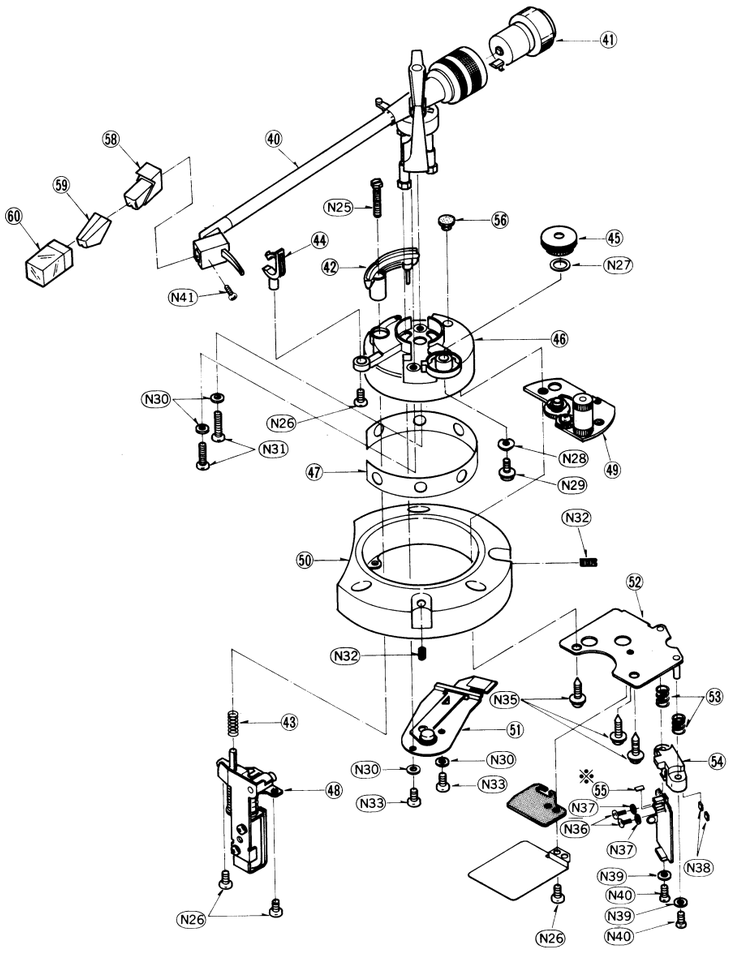
Ref. No.	Part No.	Description	
ACCESSORIES			
A1(M)	SFNUM02M01	Instruction Book	(1)
A1(MC)	SFNUM02C01E	Instruction Book	(1)
A1(EK)	SFNUM02G01	Instruction Book	(1)
A1(PA,PE, PC)	SFNUM02P01E	Instruction Book	(1)
A1(Ei)	SFNUM02I01	Instruction Book	(1)
A1(Other areas)	SFNUM02S01	Instruction Book	(1)
A2	SFWE010	45 Adaptor	(1)
A3(M,MC) ⚠	SFDAC05M01	AC Cord	(1)
A3(EK) ⚠	SFDAC05G02	AC Cord	(1)
A3(XL) ⚠	SFDAC05L01	AC Cord	(1)
A3(XA,XM) ⚠	SFDAC05X02	AC Cord	(1)
A3(PA,PE, PC) ⚠	SFDAC05N01	AC Cord	(1)
A3(XZ) ⚠	SRDA007L01	AC Cord	(1)
A3(Other areas) ⚠	SFDAC05E02	AC Cord	(1)
A4(XA,XM) ⚠ only	SFDKI19118	2 Pin Plug	(1)
A5(PA,PE, PC) only ⚠	QJP0603S	Gimens Adaptor	(1)
PACKING PARTS			
P1(MC,EF)	SFHPM02C01	Carton Box	(1)
P1(Other areas)	SFHPM02M01	Carton Box	(1)
P2	SFHHM01N01	Pad(Front),Unit	(1)
P3	SFHHM01N02	Pad(Rear),Unit	(1)
P4	SFHDM01N01	Pad,Turntable Platter	(1)
P5	SFHZM01N05	Pad,Unit(Side)	(1)
P6	SFHZM01M01	Pad,Counter Weight	(1)
P7	SFHZD03M01	Cover Sheet,Dust Cover	(1)
P8	SFYH60X80	Polyethylene Bag, Unit	(1)
P9	SFYH60X60	Polyethylene Bag, Dust Cover	(1)
P10	SFYH40X45	Polyethylene Bag, Turntable Platter	(1)
P11	SPB1083	Polyethylene Bag, Accessories	(1)

■ EXPLODED VIEWS

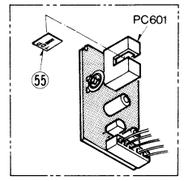
- **Cabinet and Chassis Parts**



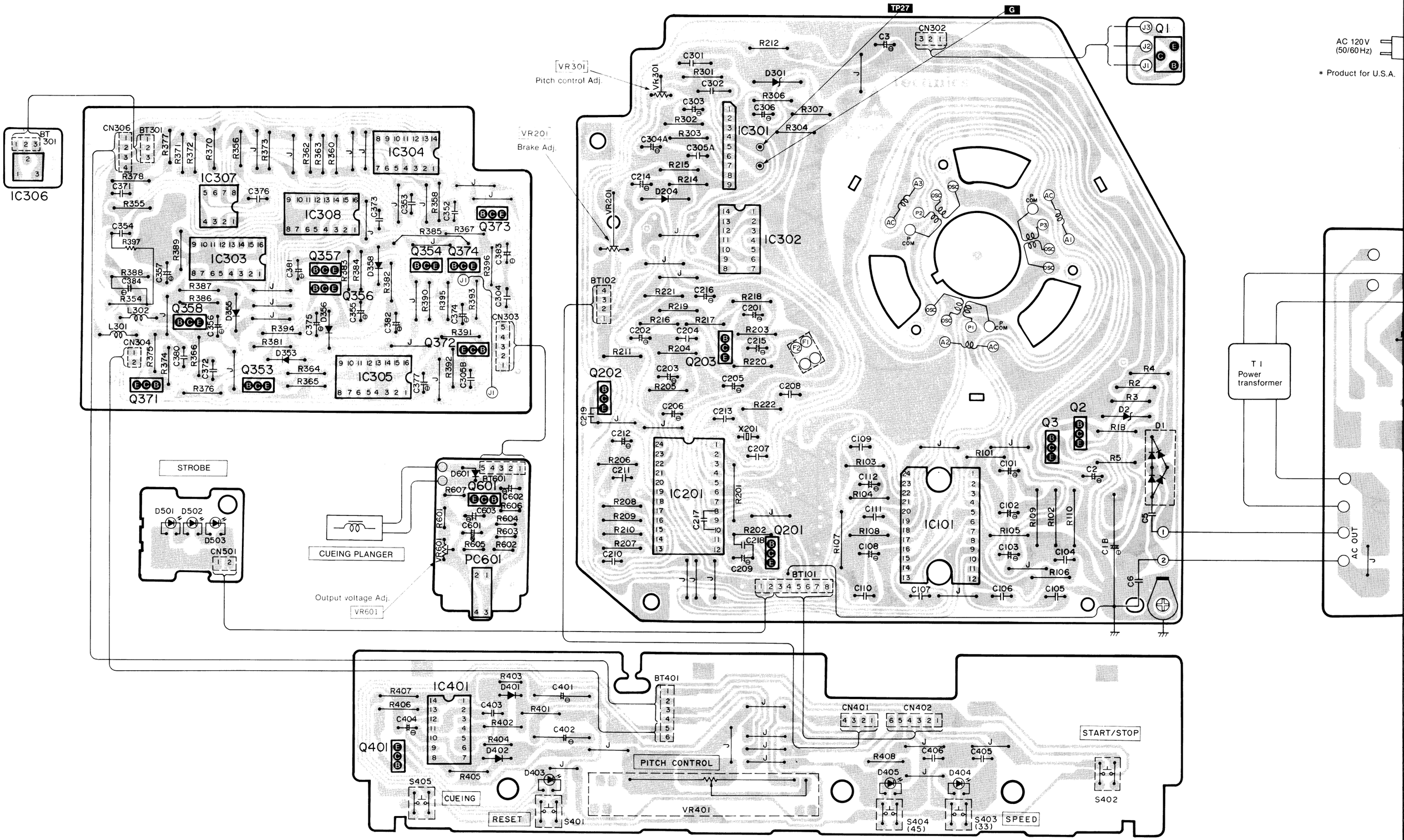
• Tonearm Parts

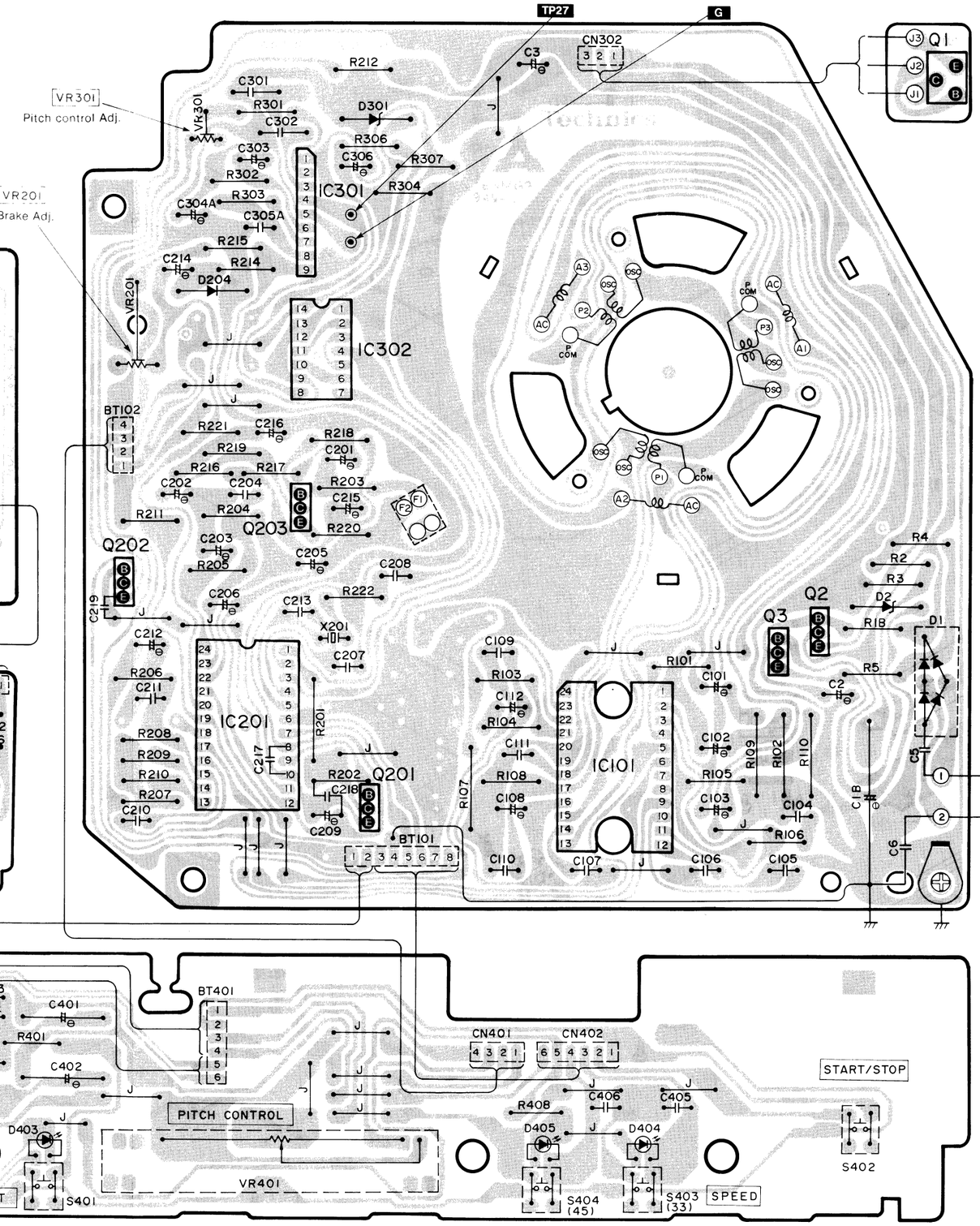


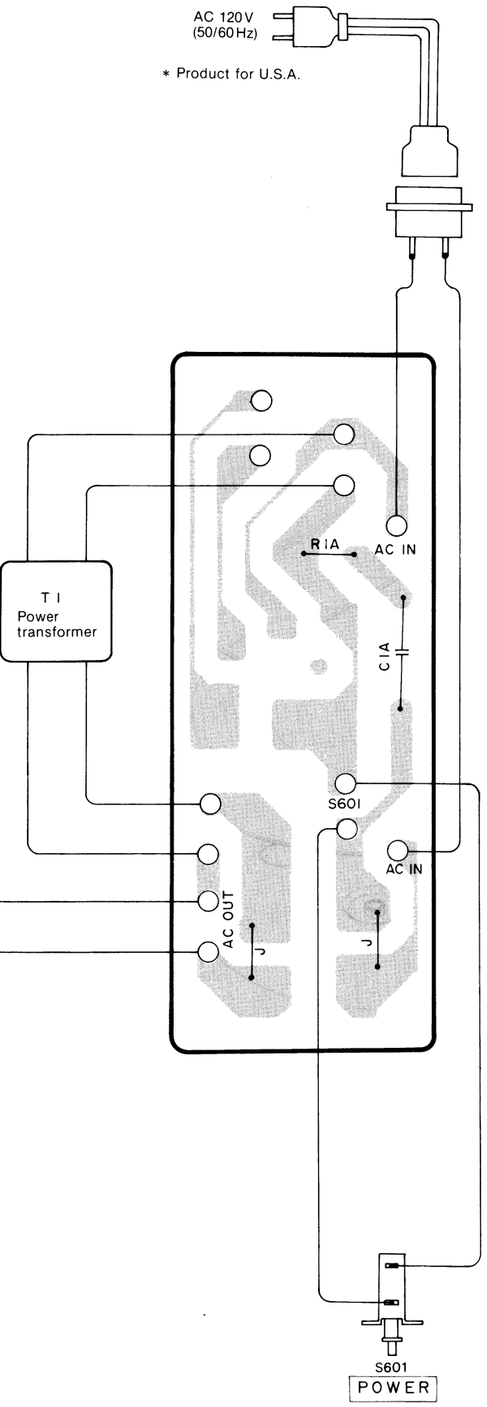
※ Attach the spacer (55) of PC601 in the position shown above.



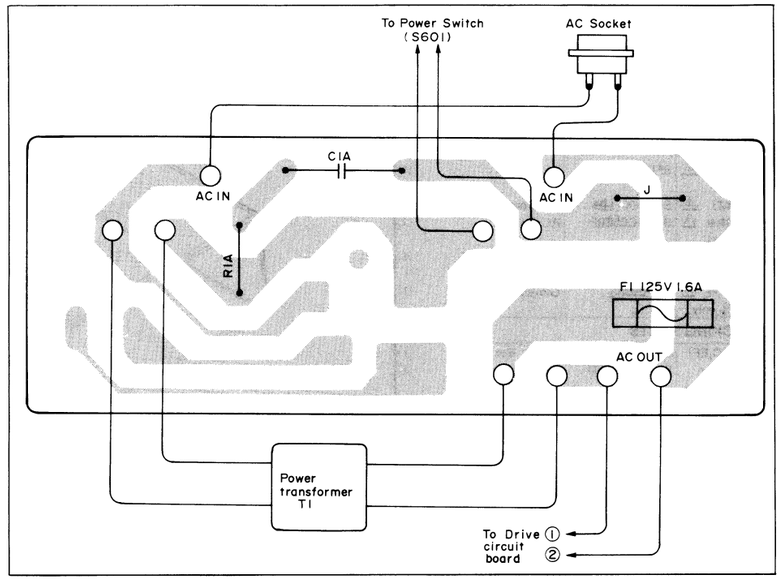
■ CIRCUIT BOARD AND WIRING CONNECTION DIAGRAM



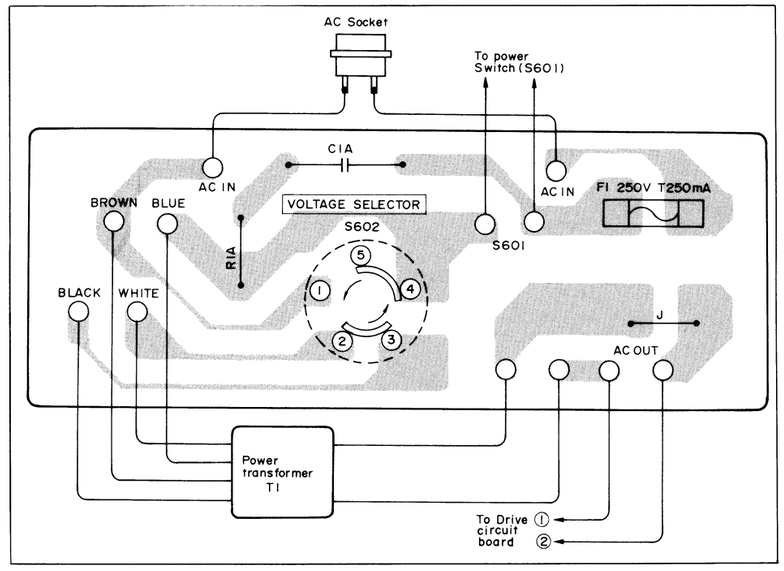




- **Power source circuit for Canada.**

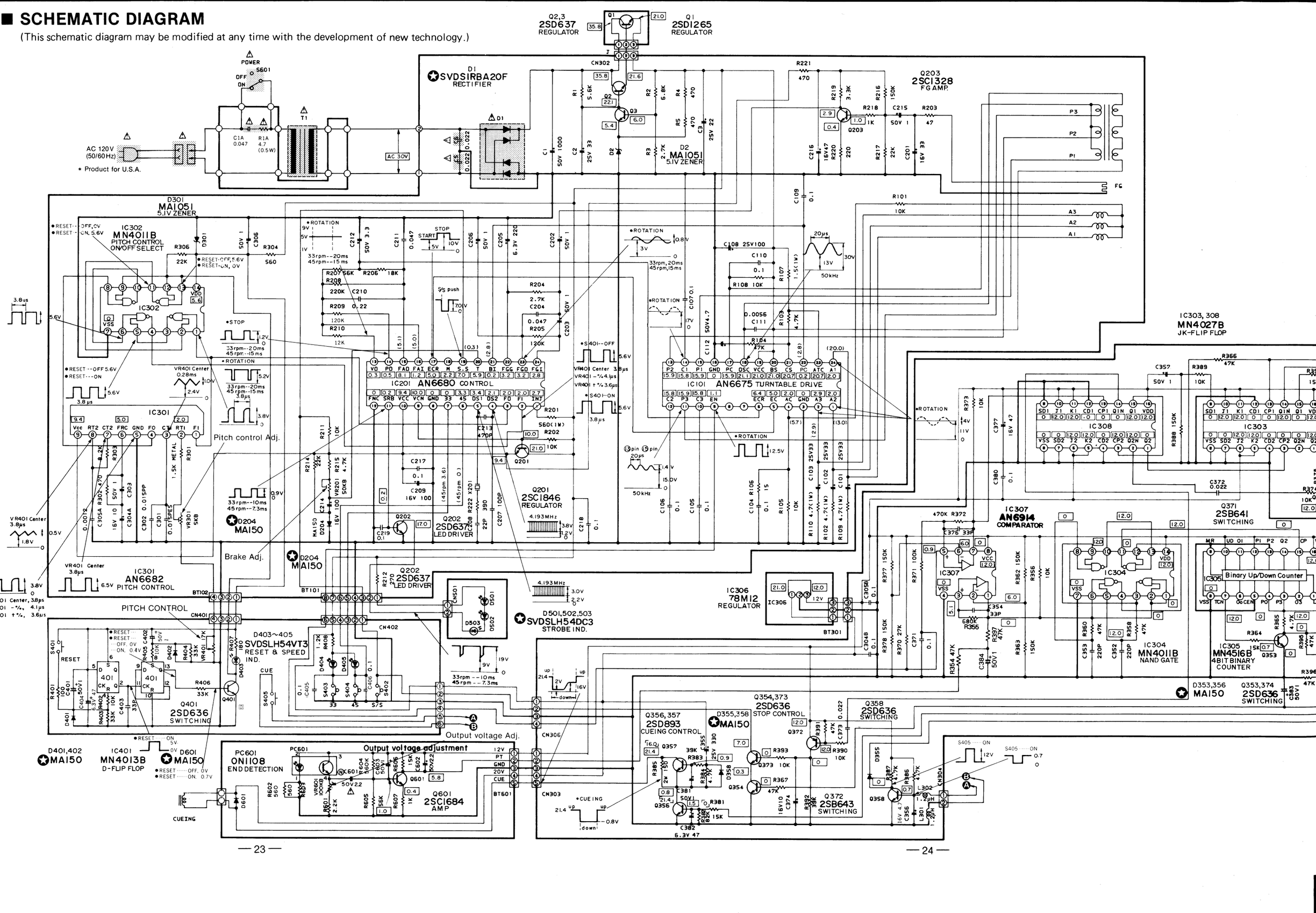


- **Power source circuit for other areas.**

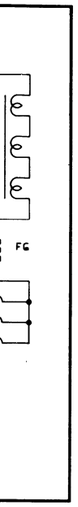


■ SCHEMATIC DIAGRAM

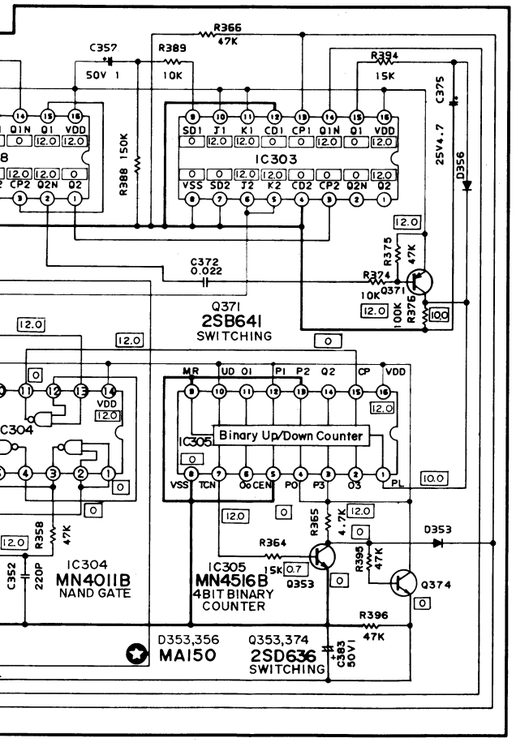
(This schematic diagram may be modified at any time with the development of new technology.)



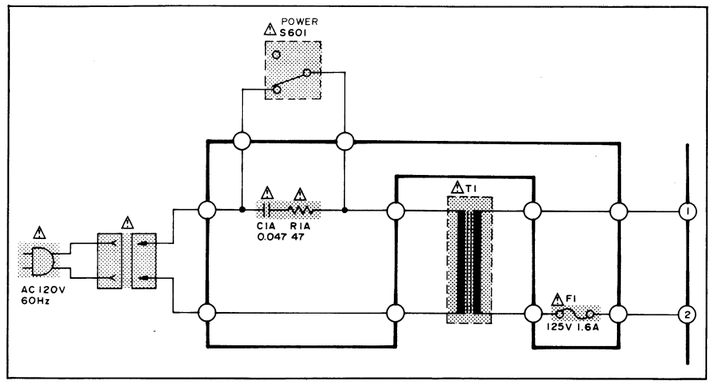
10 11 12 13 14



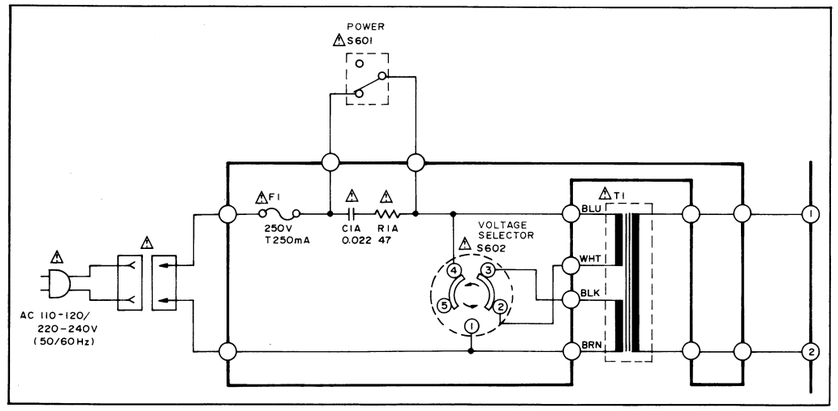
IC303, 308
MN4027B
JK-FLIP FLOP



- **Power source circuit for Canada.**



- **Power source circuit for other area.**



Notes:

1. **S301, 302** : Speed selector switch.
2. **S303** : Start/stop switch.
3. **S304** : Cueing switch.
4. **S401** : Reset switch in "**off**" position.
5. **S601** : Power switch in "**on**" position.
6. The voltage value, and waveforms are the reference voltage values of this unit measured by DC electronic voltmeter (high impedance) and oscilloscope on the basis of chassis. Therefore, the voltage value and waveform may include some erroe due to the internal impedance of the tester or the measuring set.
   * ▭ is the voltage when turntable is in stop.
   * ( ) is the voltage when turntable is in rotation. (at 33 rpm)
   * ⌐ ⌙ is the voltage when cueing is down.
7. ——— +B voltage lines.
8. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
9. The part No. of diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ✪ mark the production part No. are different from the replacement part No. Therefore, when placing an order for replacement part, please use the part No. in the replacement parts list.

IMPORTANT SAFETY NOTICE

The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

- **Product for MC only**

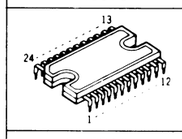
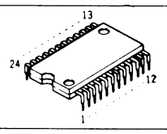
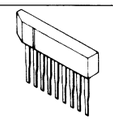
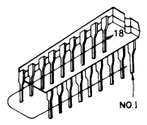
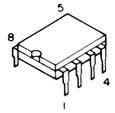
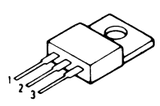
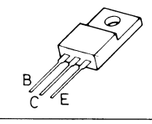
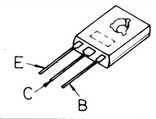
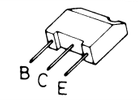
FUSE REPLACEMENT

Symbol located near the fuse indicates fast operating type. For continued protection against fire hazard, replace with same type fuse. Refer to the symbol for fuse rating.

FUSIBLE REMPLACEMENT

Le symbole qui se trouve près du fusible singifie un fusible à action rapide. Pour une protection contiue contre les risques d'incendie, n'utiliser que des fusibles du même type. Se rapporter au symbole pour la valeur des fusibles.

- **Terminal guide of transistors, diodes and IC's**

AN6675	AN6680	AN6682	MN4011B 14 Pin MN4027B 16 Pin MN4516B 16 Pin	
				
AN6914	**AN78M12**	**2SD1265**	**2SC1846**	**2SD637 2SB641 2SD636 2SB643**
				
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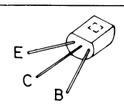
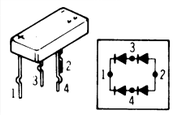
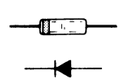
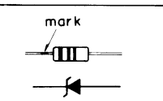
				

■ RESISTORS AND CAPACITORS

Notes: 1. Part numbers are indicated on most mechanical parts.
Please use this part number for parts orders.
2. Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. This "Ⓢ" mark is service standard parts and may differ from production parts.
4. Bracketed indications in Ref. No. colums specify the area.
Parts without these indications canbe used for all area.
5. Unless otherwise specified.
All resistors are in OHMS (Ω) K =1000Ω, M = 1000kΩ
All capacitors are in MICROFARADS (μF) P = 10^{-6}μF.

Areas

* [M] is available in U.S.A.
* [MC] is available in Canada.
* [E] is available in Switzerland and Scandinavia.
* [EK] is available in United Kingdom.
* [XL] is available in Australia.
* [EB] is available in Belgium.
* [EH] is available in Holland.
* [EF] is available in France.
* [Ei] is available in Italy.
* [EC] is available in Czechoslovakia.
* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
* [XM] is available in Central South America.
* [PA] is available in far East PX.
* [PE] is available in European Military.
* [PC] is available in European Audio Club.
* [XZ] is available in

Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

ERG	1	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type		Wattage		Tolerance	
ERD	: Carbon	25	: 1/4W	G	: ± 2%
ERG	: Metal Oxide	1	: 1W	J	: ± 5%
ERO	: Metal Film	S2	: 1/4W	K	: ± 10%
ERQ	: Fuse				

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Voltage	Value	Tolerance	Peculiarity

ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

Capacitor Type		Voltage		Tolerance	
ECEA	: Electrolytic	OJ	: 6.3V	C	: ± 0.25pF
ECEB	: Electrolytic	1A	: 16V	G	: ± 2%
ECEA...N	: Non Polar Electrolytic	1C	: 16V	J	: ± 5%
ECCD	: Ceramic	1E	: 25V	K	: ± 10%
ECCR	: Ceramic	25	: 25V	M	: ± 20%
ECKD	: Ceramic	1V	: 35V	P	: +100%, −0%
ECQM	: Polyester	1H	: 50V	Z	: +80%, −20%
ECQP	: Polypropylene	MY	: 125VAC		
ECES	: Electrolytic	ECQP1	: 100V		

● RESISTORS

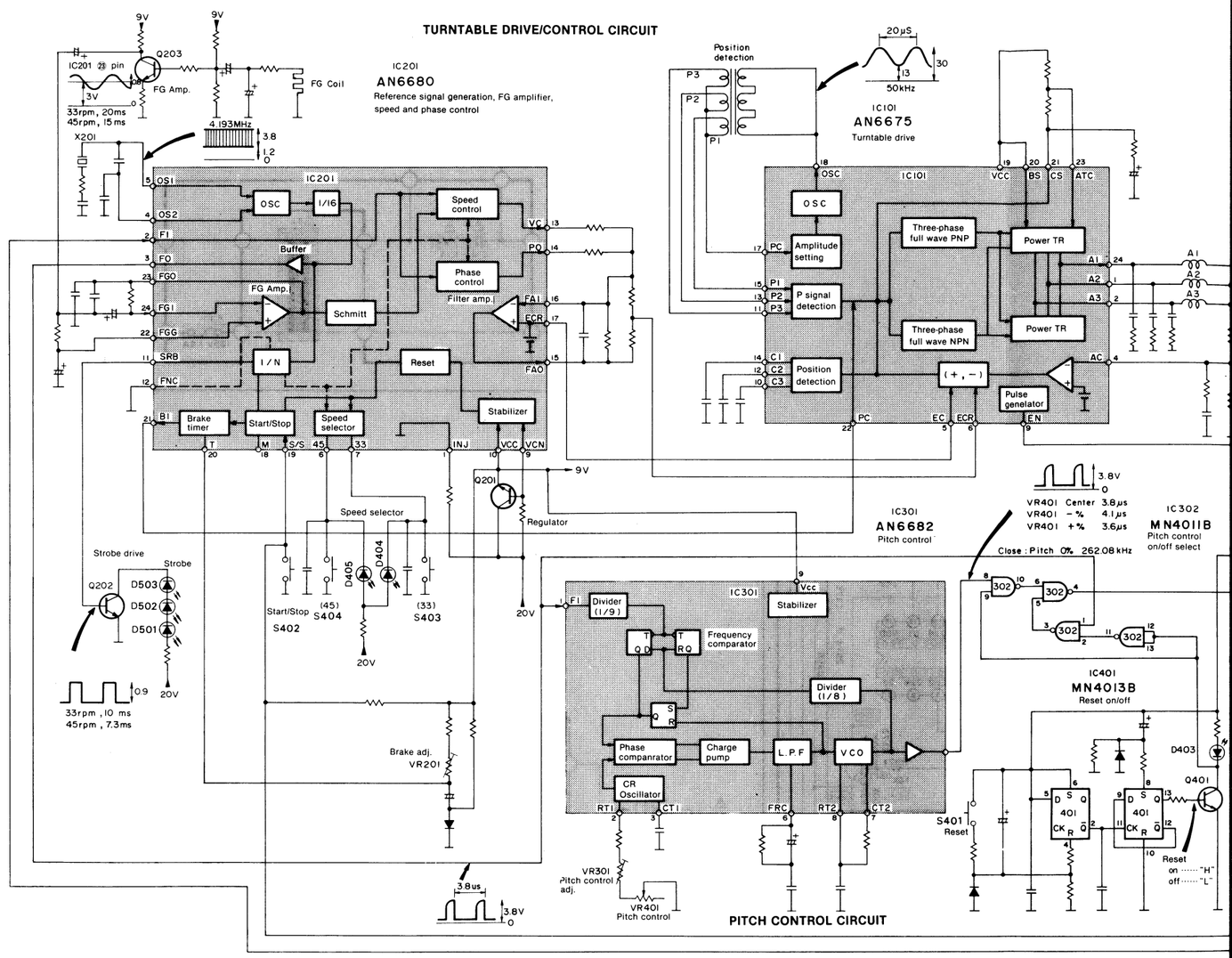
Ref. No.	Part No.	Value
R1A ⚠Ⓢ	ERD50FJ4R7	4.7K
R1B Ⓢ	ERD25FJ562	5.6K
R2 Ⓢ	ERD25FJ682	6.8K
R3 Ⓢ	ERD25FJ272	2.7K
R4,5 Ⓢ	ERD25FJ471	470
R101 Ⓢ	ERD25FJ103	10K
R102 Ⓢ	ERX1ANJ4R7	4.7
R103 Ⓢ	ERD25FJ472	4.7K
R104 Ⓢ	ERD25TJ473	47K
R105 Ⓢ	ERD25FJ103	10K
R106 Ⓢ	ERD25FJ150	15
R107 Ⓢ	ERX1ANJ1R5	1.5
R108 Ⓢ	ERD25FJ103	10K
R109,110 Ⓢ	ERX1ANJ4R7	4.7
R201 Ⓢ	ERG1ANJ561	560
R202 Ⓢ	ERD25FJ103	10K
R203 Ⓢ	ERD25FJ470	47
R204 Ⓢ	ERD25FJ272	2.7K
R205 Ⓢ	ERD25TJ124	120K
R206 Ⓢ	ERD25TJ183	18K
R207 Ⓢ	ERD25TJ563	56K

Ref. No.	Part No.	Value
R208 Ⓢ	ERD25TJ224	220K
R209 Ⓢ	ERD25TJ124	120K
R210 Ⓢ	ERD25TJ123	12K
R211 Ⓢ	ERD25FJ103	10K
R212 Ⓢ	ERD25FJ271	270
R214 Ⓢ	ERD25TJ223	22K
R215 Ⓢ	ERD25FJ472	4.7K
R216 Ⓢ	ERD25TJ154	150K
R217 Ⓢ	ERD25TJ223	22K
R218 Ⓢ	ERD25FJ102	1K
R219 Ⓢ	ERD25FJ332	3.3K
R220 Ⓢ	ERD25FJ221	220
R221 Ⓢ	ERD25FJ471	470
R222 Ⓢ	ERD25FJ391	390
R301 Ⓢ	ERO25CKF1501	1.5K
R302 Ⓢ	ERD25FJ471	470
R303 Ⓢ	ERD25FJ822	8.2K
R304 Ⓢ	ERD25FJ561	560
R306 Ⓢ	ERD25TJ223	22K
R354 Ⓢ	ERD25TJ473	47K
R355 Ⓢ	ERD25TJ684	680K

Ref. No.	Part No.	Value
R356 Ⓢ	ERD25FJ103	10K
R358 Ⓢ	ERD25TJ473	47K
R360 Ⓢ	ERD25TJ473	47K
R362,363 Ⓢ	ERD25TJ154	150K
R364 Ⓢ	ERD25TJ153	15K
R365 Ⓢ	ERD25FJ472	4.7K
R366,367 Ⓢ	ERD25TJ473	47K
R370 Ⓢ	ERD25TJ273	27K
R371 Ⓢ	ERD25TJ104	100K
R372 Ⓢ	ERD25TJ474	470K
R373,374 Ⓢ	ERD25FJ103	10K
R375 Ⓢ	ERD25TJ473	47K
R376 Ⓢ	ERD25TJ104	100K
R377,378 Ⓢ	ERD25TJ154	150K
R381 Ⓢ	ERD25TJ153	15K
R382 Ⓢ	ERD25TJ823	82K
R383 Ⓢ	ERD25TJ393	39K
R384 Ⓢ	ERD25FJ472	4.7K
R385 Ⓢ	ERG2ANJ151	150
R386,387 Ⓢ	ERD25FJ472	4.7K
R388 Ⓢ	ERD25TJ154	150K

Ref. No.	Part No.	Value
R389,390 Ⓢ	ERD25FJ103	10K
R391 Ⓢ	ERD25TJ473	47K
R392 Ⓢ	ERD25TJ393	39K
R393 Ⓢ	ERD25FJ103	10K
R394 Ⓢ	ERD25TJ153	15K
R395,396 Ⓢ	ERD25TJ473	47K
R397 Ⓢ	ERD25TJ473	47K
R401 Ⓢ	ERD25FJ101	100
R402 Ⓢ	ERD25FJ103	10K
R403,404 Ⓢ	ERD25TJ333	33K
R405 Ⓢ	ERD25FJ103	10K
R406 Ⓢ	ERD25TJ333	33K
R407 Ⓢ	ERD25FJ181	180
R408 Ⓢ	ERD25FJ122	1.2K
R601 Ⓢ	ERD25FJ222	2.2K
R602,603 Ⓢ	ERD25FJ561	560
R604 Ⓢ	ERD25TJ564	560K
R605 Ⓢ	ERD25TJ563	56K
R606 Ⓢ	ERD25TJ153	15K
R607 Ⓢ	ERD25FJ102	1K

■ BLOCK DIAGRAM



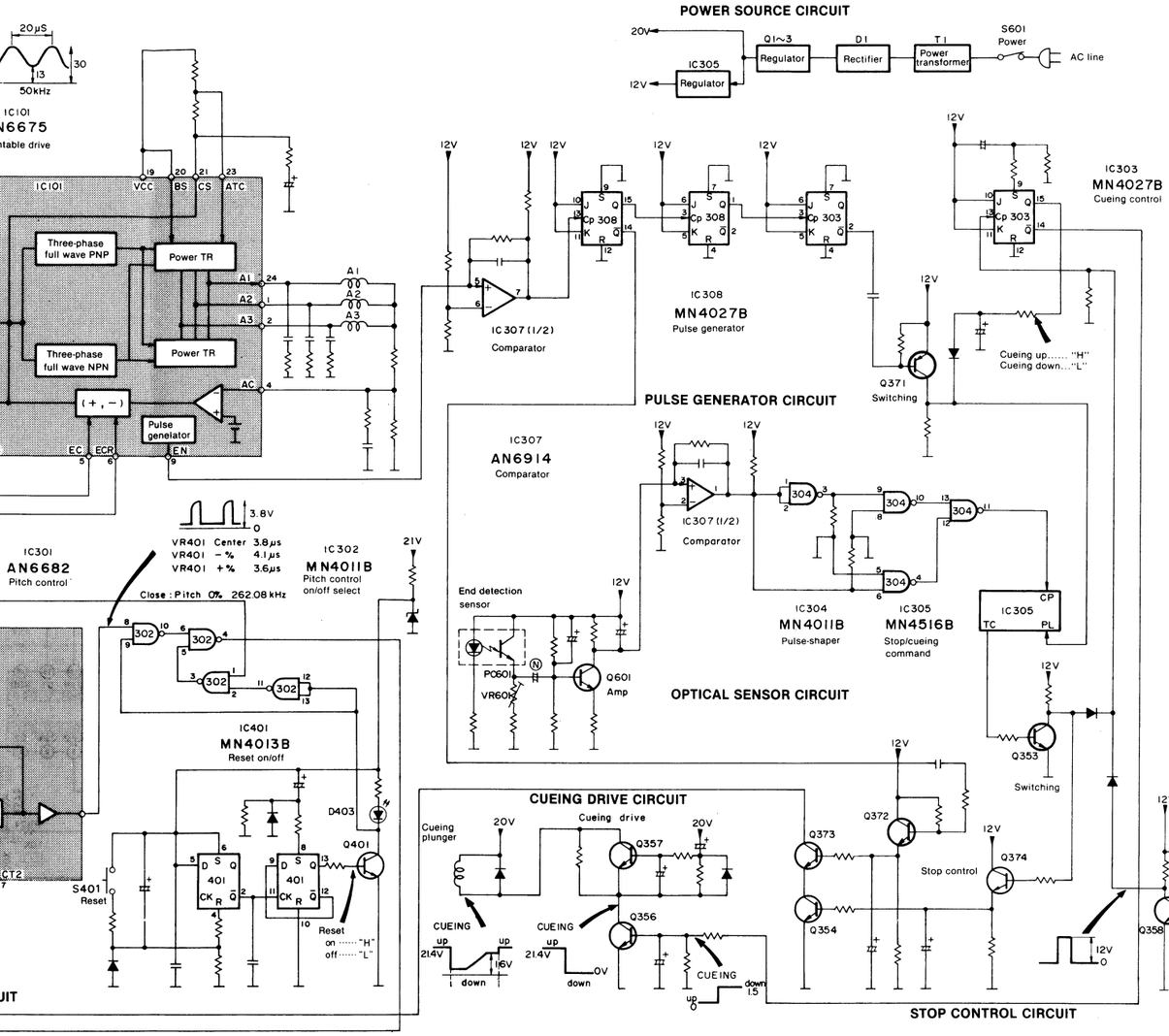
● CAPACITORS

Ref. No.	Part No.	Value
C1A(M,MC) ⚠	ECQU1A473ME	0.047
C1A(XA,XM, PA,PE,PC) ⚠	ECQE2A223ME	0.022
C1A(Other areas) ⚠	ECQU2A223MF	0.022
C1B Ⓢ	ECEB1HU102	1000
C2 Ⓢ	ECEA1EU330	33
C3 Ⓢ	ECEA1EU220	22
C5,6 ⚠	ECQM1223KZ	0.022
C101,102 Ⓢ	ECEA1EU330	33
C103 Ⓢ	ECEA1EU330	33
C104,105 Ⓢ	ECQM1H104JZ	0.1
C106,107 Ⓢ	ECQM1H104JZ	0.1
C108	ECEA1EU101	100
C109,110 Ⓢ	ECQM1H104JZ	0.1
C111 Ⓢ	ECQM1H562JZ	0.0056
C112 Ⓢ	ECEA1HU4R7	4.7
C201 Ⓢ	ECEA1CU330	33

Ref. No.	Part No.	Value
C202,203 Ⓢ	ECEA1HU010	1
C204 Ⓢ	ECQM1H473JZ	0.047
C205 Ⓢ	ECEA0JU221	220
C206 Ⓢ	ECEA1HU010	1
C207 Ⓢ	ECCD1H101K	100P
C208 Ⓢ	ECCD1H220K	22P
C209 Ⓢ	ECEA1CU101	100
C210 Ⓢ	ECQM1H224JZ	0.22
C211 Ⓢ	ECQM1H473JZ	0.047
C212 Ⓢ	ECEA1HU3R3	3.3
C213 Ⓢ	ECCD1H471K	470P
C214 Ⓢ	ECEA1CU101	100
C215 Ⓢ	ECEA1HU010	1
C216 Ⓢ	ECEA1CU470	47
C217,218 Ⓢ	ECKD1H104KB	0.1
C219 Ⓢ	ECKD1H104KB	0.1

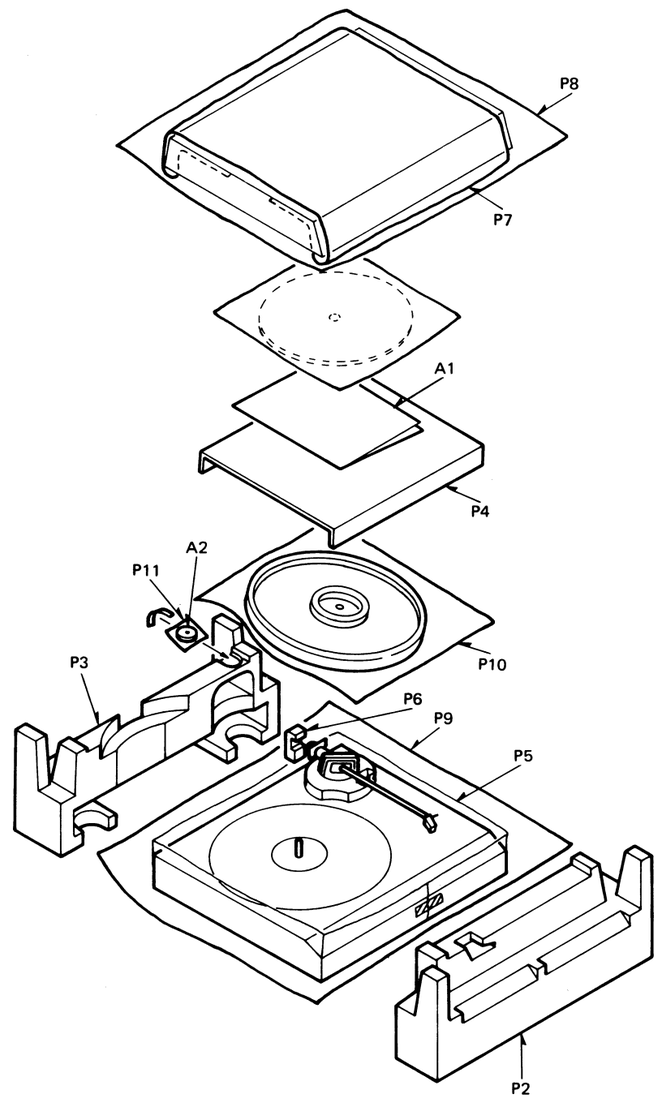
Ref. No.	Part No.	Value
C301	ECQP1153JZ	0.015
C302 Ⓢ	ECQM1H153JZ	0.015
C303 Ⓢ	ECEA1HU010	1
C304A Ⓢ	ECEA1HU100	10
C304B Ⓢ	ECQM1H104JZ	0.1
C305A Ⓢ	ECQM1H122JZ	0.0012
C305B Ⓢ	ECQM1H104JZ	0.1
C306 Ⓢ	ECEA1HU010	1
C352,353 Ⓢ	ECCD1H221K	220P
C354 Ⓢ	ECCD1H330K	33P
C355 Ⓢ	ECEA1EU331	330
C356 Ⓢ	ECEA50Z4R7	4.7
C357 Ⓢ	ECEA1HU010	1
C371 Ⓢ	ECQM1H104JZ	0.1
C372,373 Ⓢ	ECQM1H223JZ	0.022
C374 Ⓢ	ECEA1CU100	10

Ref. No.	Part No.	Value
C375 Ⓢ	ECEA1VU4R7	4.7
C376 Ⓢ	ECCD1H330K	33P
C377 Ⓢ	ECEA1CU470	47
C378,379	ECFR1H104ZF	0.1
C380	ECFR1H104ZF	0.1
C381 Ⓢ	ECEA1HU010	1
C382 Ⓢ	ECEA0JU470	47
C383 Ⓢ	ECEA1HU010	1
C384 Ⓢ	ECEA1HU010	1
C401,402 Ⓢ	ECEB1HU010	1
C403 Ⓢ	ECCD1H330K	33P
C404 Ⓢ	ECEA0JU470	47
C405,406	ECFR1H104ZF	0.1
C601 ⚠	ECEA1HN2R2S	2.2
C602 Ⓢ	ECEA1HU2R2	2.2
C603 Ⓢ	ECEA1HU010	1

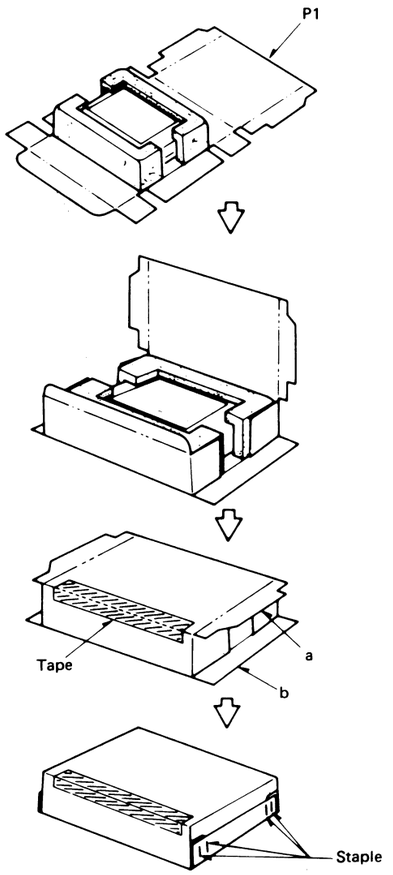


	Part No.	Value
Ⓢ	ECEA1VU4R7	4.7
Ⓢ	ECCD1H330K	33P
Ⓢ	ECEA1CU470	47
	ECFR1H104ZF	0.1
	ECFR1H104ZF	0.1
Ⓢ	ECEA1HU010	1
Ⓢ	ECEA0JU470	47
Ⓢ	ECEA1HU010	1
Ⓢ	ECEA1HU010	1
Ⓢ	ECEB1HU010	1
Ⓢ	ECCD1H330K	33P
Ⓢ	ECEA0JU470	47
	ECFR1H104ZF	0.1
△	ECEA1HN2R2S	2.2
Ⓢ	ECEA1HU2R2	2.2
Ⓢ	ECEA1HU010	1

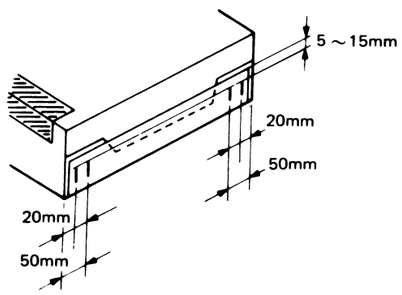
■ PACKING



1. Plase the unit (with cushions attached) as illustrated.
2. Fold the flaps according to the line marks.
3. Seal the top with adhesive tape.
   * Use gum tape or adhesive cloth tape of 50mm wide at least.
4. For the edges, first fold the flap "a" and then flap "b", and staple. Remember to staple only flap "b". (Use 15 or 16mm staple)



* Stapling positions are shown below.



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